LATINOS AND THE NATURAL ENVIRONMENT ALONG THE UNITED STATES−MEXICO BORDER

A Dissertation

by

ANGELICA LOPEZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2011

Major Subject: Recreation, Park and Tourism Sciences

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ABSTRACT

Latinos and the Natural Environment along the

United States–Mexico Border.

(December 2011)

Angelica Lopez, B.S.; B.S.; M.S., Texas A&M University

Chair of Advisory Committee: Dr. Cruz C. Torres

The vitality of international transborder natural resources is important for the preservation of wildlife corridors, clean water, clean air, and working lands. In particular, not only does the Texas Rio Grande Valley Region in the United States (U.S.), on the U.S.-Mexico border, offer critical habitat important to North American migratory species, the area also provides substantial agricultural goods (i.e., sugarcane, sorghum, melons, onions, citrus, carrots, cabbage, and cattle). Hence, the dilemma between consumptive and non-consumptive uses of natural resources along a large geographic expanse separated by sociopolitical and sociocultural differences, is further complicated. Latinos of Mexican descent along the southwestern U.S. are one of the fastest growing ethnic groups in the U.S., yet their influence on U.S. natural resource allocation and management has been largely ignored. For this reason, the purpose of my study was threefold: (1) to determine public perceptions toward natural resources, the environment, and conservation; (2) to assess general environmental behaviors; and (3) to determine general recreational behaviors among three student population groups along the U.S.–Mexico border region. The student groups were comprised of Texas students

(Texas Latino and Texas non-Latino white), and Mexican students from three northern Mexico states, Chihuahua, Coahuila, and Tamaulipas. A survey was derived from three of the most frequently used environmental concern, behavior, and recreation indices used for research in the discipline.

Predictors of environmental concern, behavior, and outdoor recreation participation for my sample varied across sociodemographic and sociopolitical variables for each student group. A review of environmental attitudes found Mexican students were more environmentally friendly (≈ 2.35 odds; $P < 0.05$) than their U.S. counterparts. Among the three student groups, basic environmental behaviors (environmental conservation contribution; avoiding environmentally harmful products; changing car oil; and lawn responsibility) were influenced ($P < 0.05$) by environmental orientation, political candidate's environmental position, father and mother's educational attainment, place of origin, sex, and combined parent income. Outdoor recreation participation and constraints to outdoor recreation participation among the student groups were influenced ($P < 0.05$) by parent income, age, place of origin, and environmental orientation. Examples of constraints were: not enough money, personal health reasons, inadequate transportation, and personal safety reasons. Findings from my study benefit natural resource and environmental organizations pursuing collaborative program development and implementation along the U.S.–Mexico border and other transborder regions.

DEDICATION

I dedicate my work:

to my loving parents and siblings,
for your sacrifices, patience, and support

to my wonderful husband,
for believing in me

to my awesome kids,
for giving my life new meaning

to Michael, Elsa, and Ray
for all your prayers and miracles

to Cruz,
for helping me peel the layers

and

to Val Silvy,
for your life example:
giving unconditionally and
being kind towards those who are not

ACKNOWLEDGMENTS

I would like to acknowledge all the help and support provided by my committee, Drs. Torres, Silvy, Griffin, and McIntosh, professors, advisors, peers, and friends. Each of you has given me a different lens from which to view life and people; until then, I was only capturing the surface. I would also like to acknowledge Dr. Wigenbach and Dr. Gil for their assistance with this project. Finally, I would like to acknowledge everyone who dissuaded me from obtaining an education. If you had not persisted, I would not be writing this acknowledgement today.

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CHAPTER I

INTRODUCTION

Natural resource managers continually face challenges in managing public natural resources, particularly when emerging stakeholders are ethnoculturally diverse, and may or may not share the same fundamental resource management values. Thus, a fundamental problem for natural resource managers is to recognize and consider the new stakeholder's interests in management and policy decision-making processes (Bromley 1991, Decker et al. 2001). Stakeholders ultimately will be affected by and will affect the future of natural resource management (Susskind and Cruikshank 1987, Decker et al. 2001). Understanding differences in stakeholder attitudes and knowledge toward natural resources and resource management is needed for the overall acceptance and success of management decisions made by wildlife agencies. Moreover, understanding stakeholder attitudes and knowledge base about natural resource management is essential in successfully implementing public outreach programs.

EMERGING STAKEHOLDER

Latinos in the United States (U.S.) are a growing segment of the population and will undoubtedly be an important stakeholder in the future of wildlife management. Nationally, Latino sociodemographics are expected to see significant changes in the next 40 years (Figure 1.1). Texas supports the second largest Latino community in the country. Latinos are expected to comprise nearly 60% of the Texas population by 2040, the majority of which are of Mexican descent (U.S. Census Bureau, Population Survey

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This dissertation follows the style of the Journal of Wildlife Management.

2000, Murdock et al. 2003). Given this sociodemographic trend, understanding Latino knowledge and attitudes toward natural resources is essential to wildlife agencies if they expect to be more effective in achieving their goals of protecting and managing wildlife resources.

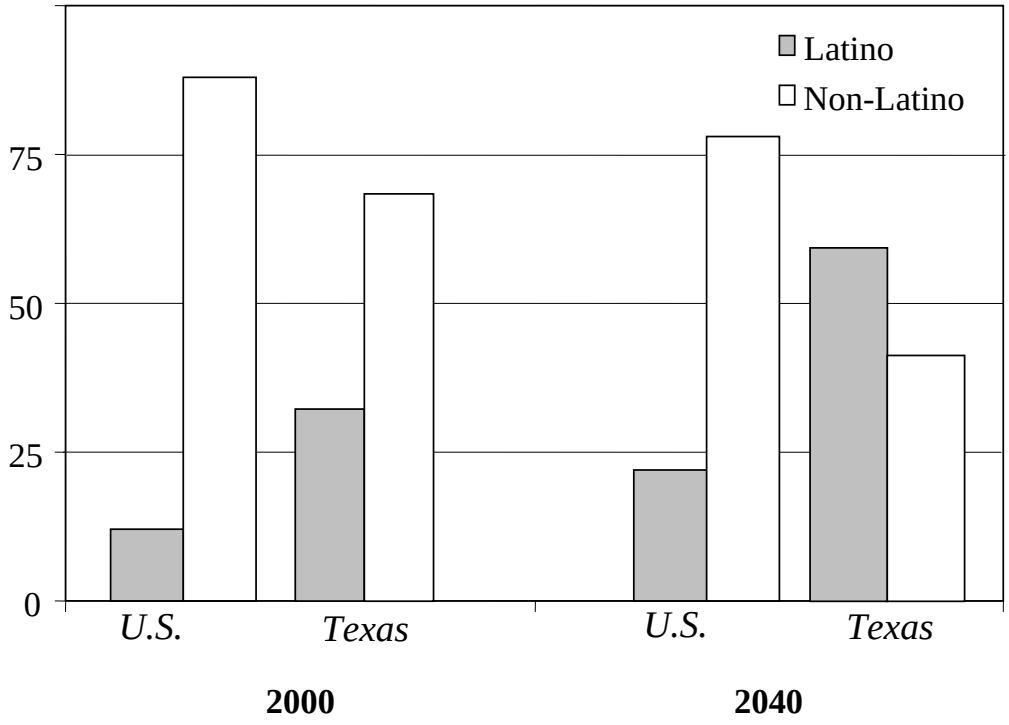


Figure 1.1. Population composition (percent) of Latinos and non-Latinos in the United States (U.S.) and Texas, 2000 and 2040 (Source: U.S. Census Bureau, Population Survey 2000).

Today, the rapid growth of the Latino population throughout the U.S., but more specifically in the Southwest, provides an important turning point in the history of environmental and natural resource attitudes, allocation, and management. The influence Latinos will have on the allocation and management of natural resources in Texas is significant. For example, Texas ranks second in the nation in hunting activities, which contributes nearly $3.6 billion to the state's economy (Brown et al. 2003). Future predictions estimate declines of 10,000–20,000 fewer Texas hunters/year, where currently <3% of hunters are Latino (Brown et al. 2003). An increase in the non-hunter Latino population with an overall decrease in hunter participation will undoubtedly impact hunting and associated activities in Texas (Brown et al. 2003). Failure to engage the Latino community in wildlife conservation (e.g., hunting and fishing which financially supports many wildlife programs) will have a dramatic impact on the future of natural resources, yet there is little information regarding Latinos' natural resource and environmental attitudes and concerns. Studies concerning environment and natural resource attitudes have been conducted in response to ecological and environmental changes as a means to identify and ameliorate specific concerns (Kaplan and Talbot 1988, Pfeffer and Stycos 2002). Many surveys have also been developed to determine natural resource and environmental concerns in the U.S. (e.g., Weigel and Weigel 1978, Dunlap et al. 2000, General Social Survey 2003). Yet, few if any studies have focused exclusively on Latinos in the U.S. (Noe and Snow 1990, Schultz et al. 2000), much less Texas (Klineberg 1998).

WILDLIFE KNOWS NO BOUNDARIES

The United States−Mexico borderlands embody a sociocultural and sociopolitical divide nestled in a shared geographical space. The borderland region is comprised of grasslands and ranchlands (Basurto and Hadley 2001) with unique and diverse habitats that are home to both endangered and endemic species of wildlife (Valdez et al. 2006; Fig. 1.2). Sociopolitical differences between the two nations have led to the creation of a border fence (Secure Fence Act of 2006) that impacts wildlife (Sayre and Knight 2009) and that also endangers the life of human beings looking for alternatives in the United States (Kelly 2007). Many environmental problems impact this fragile borderland region. These are the result of major industrial and agricultural activities, which have led to pollution and have had an overall negative impact on human health (baby deformations, upstream dynamics, etc.) on both sides of the border (Metzger et al. 1995, and Tillett 2005). Thus, unlike many other regions experiencing the consequences of rapid population growth, urban growth and habitat loss are only a few of the issues impacting people and wildlife in this borderland region.

An important component to this region is the stakeholders who will shape the future of its natural resources. The border human population experiences a high turnover rate due to in- and out-migration of residents in the region, coupled with the creation of new generations within the United States. Low educational attainment and poverty are prevalent among incoming, permanent, and outgoing residents. This combination of resident type and socioeconomic characteristics of the local population adds to the complexity of attempting to manage natural resources in the region. Thus the

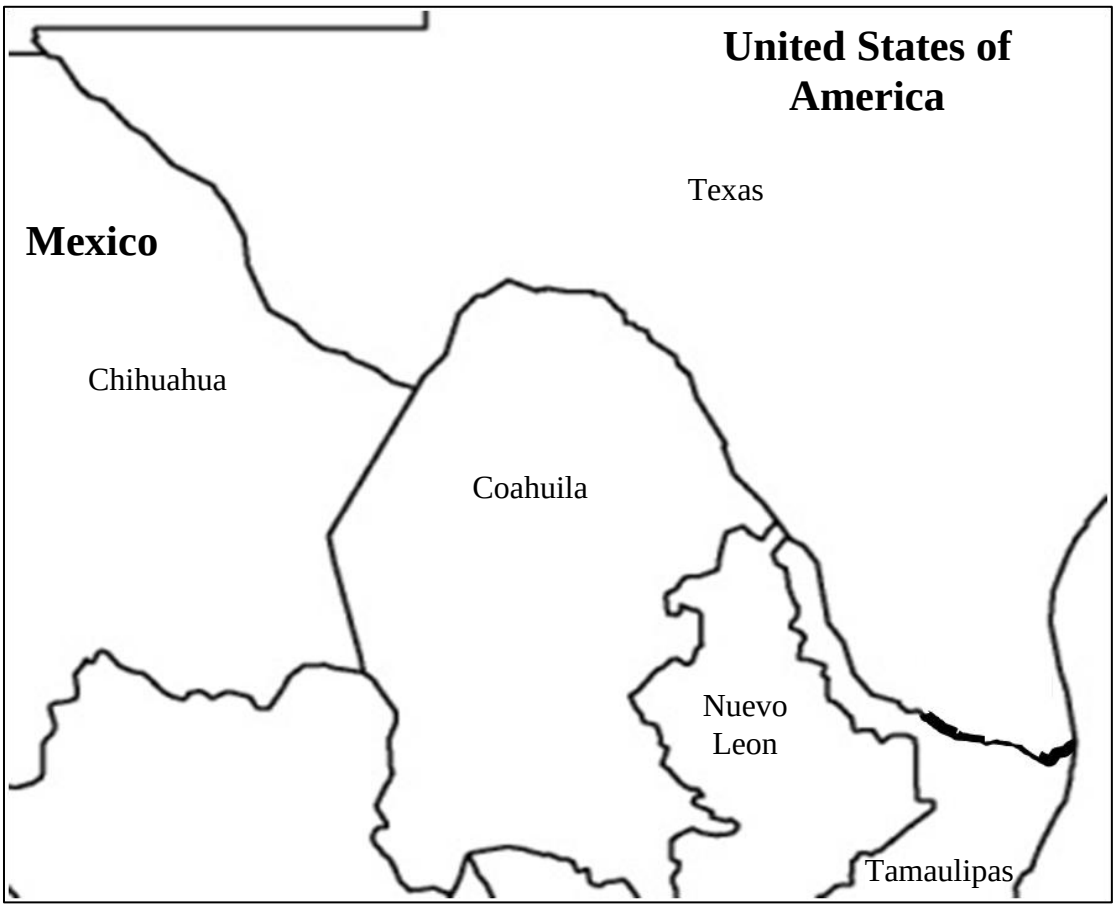


Figure 1.2. Map of United States−Mexico borderland region. [Adapted from National Butterfly Center website (nationalbutterflycenter.org) February 11, 2011 at 11:10 AM.]

ability to predict and prepare for stakeholder behaviors and attitudes becomes paramount to the success of conservation initiatives. Oftentimes, stakeholder environmental behaviors, such as recycling, offer clues as to their support for natural resource conservation initiatives (Schultz et al. 1995). A measure of environmental behavior participation, for example, provides insight into one's support for future environmental

initiatives (Parisi et al. 2004). Likewise, outdoor recreation participation, such as hunting, fishing, and bird watching (Van Velsor and Nilon 2006) offers natural resource managers a clue as to the success of future conservation initiatives.

The literature, however, is replete with arguments suggesting stakeholder attitudes may or may not adequately represent or predict future behavior (McCleery et al. 2006). I propose any and all information natural resource program managers access about a specific stakeholder, particularly a stakeholder that has not been an active participant in these matters (i.e., individuals living along the U.S.—Mexico border), is important to meeting the needs of future conservation initiatives, as this information provides a general understanding of stakeholder attitudes coupled with stakeholder environmental behaviors that would otherwise be absent. Programs that are tailored to emergent stakeholder interests, attitudes and behaviors are more likely to succeed in promoting natural resource conservation. Programs which ultimately foster partnerships between natural resource agencies and constituents enhance the management of wildlife resources and support wildlife agencies and their mission (Harris 1985, Duda and Brown 1999, Decker et al. 2001).

Study Objectives

The overall objective of my study is to gain an understanding of three student populations on both sides of the U.S.—Mexico border (Mexicans, Texas Latinos, and Texas non-Latino whites) to better inform decisions related to the management of natural resources along this U.S.-Mexico corridor. Specifically, my three research objectives are:

1. To determine the attitudes college and university students living in this area hold toward the environment (Chapter II).
2. To determine the general behaviors of college and university students living in this area, with respect to various environmental activities (Chapter III).
3. To determine recreational behaviors of college and university students living in this area (Chapter IV).

I will conclude my study by offering an outline of "best practices" for government agencies, NGOs, and other conservation-oriented organizations to consider in engaging Latinos on both sides of the border (Chapter V).

CHAPTER II

ENVIRONMENTAL ATTITUDES AMONG THREE POPULATIONS ALONG THE U.S.–MEXICO BORDER

INTRODUCTION

Natural resource managers continually face challenges in managing public natural resources, particularly with emerging stakeholders, oftentimes because very little information is available regarding their attitudes and knowledge toward specific natural resource issues. A fundamental problem for natural resource agencies is recognizing and considering stakeholder interests in the management and policy decision-making processes (Bromley 1991, Decker et al. 2001). Ultimately, stakeholder perspectives and attitudes will affect the future of natural resource management (Susskind and Cruikshank 1987, Decker et al. 2001). Thus, understanding differences in stakeholder attitudes and knowledge is needed for the overall acceptance and success of management decisions made by wildlife agencies. To implement public outreach programs, which foster partnerships between the agency and its constituents, an understanding of stakeholder attitudes and knowledge toward natural resources and the environment is essential. Partnerships formed from these outreach programs will enhance the management of natural resources and increase support for natural resource agencies and their missions (Harris 1985, Duda and Brown 1999, Decker et al. 2001).

Increasingly, Latinos, one of the fastest growing ethnic groups in the U.S., will be an important stakeholder target for wildlife agency outreach programs (Lopez et al. 2005). The rapid growth of the Latino population in the United States (U.S.),

specifically in the Southwest, has become increasingly important because of the influence Latinos will have on the future allocation and management of natural resources (Lopez et al. 2005). Yet research on Latino environmental and natural resource attitudes is very limited and fails to incorporate key cultural characteristics of the Latino population – cultural characteristics that influence attitude formation. Few studies have focused exclusively on determining Latino environmental attitudes in the United States (e.g., Noe and Snow 1990, Schultz et al. 2000), even less research has focused on Texas (Klineberg 1998, Lopez 2005). Exposure in the United States to the education system and labor force participation may influence language, income, family values, and political activity (Burroughs and Reeff 1996, Marín and Gamba 1996, Schultz et al. 2000). As a result of the void in the literature, there is little knowledge regarding Latinos and their attitudes toward natural resources, wildlife, and the environment. This information void is compounded by the failure of previous studies to adequately measure U.S. Latino attitudes.

Because Latinos now represent a larger segment of the United States population, they have become an important stakeholder in natural resource management (Lopez et al. 2005). Currently, Texas has the second largest Latino community in the country. Latinos are expected to comprise nearly 60% of the Texas population by 2040, the majority being of Mexican descent (U.S. Census Bureau 2000, Murdock et al. 2003). Although the percentage of United States Latinos who have earned a college degree has increased from 5.6% in 1980 to10.9% in 2009, they continue to lag behind non-Latino whites (20.3% and 30%, respectively) in educational attainment (U.S. Census Bureau

2009). The percentage of Texas Latinos who have earned a bachelor's degree or higher are below the national average: 32.9% for non-Latino whites and 9.2% for Latinos. In 2028, the percentage of United States Latino males and females who are expected to earn a bachelor's degree is projected to be 13.6% (31.3%, non-Latino white) and 16.9% (30.3%, non-Latino white), respectively (U.S. Census Bureau 2000). This is important because previous studies found that higher educational attainment is associated with more environmentally friendly attitudes and behaviors (Klineberg et al. 1998). Thus, understanding the knowledge base and attitudes of educated Latinos toward natural resources will enhance the ability of agencies to engage these new stakeholders in conservation efforts (Lopez et al. 2005).

The vitality of international transborder wildlife corridors is important for the preservation of migratory species along an expanse separated by sociopolitical and sociocultural differences (Goodwin 2000, Fernandez and Carson 2002, Valdez et al. 2006). Mexico serves as a vital wildlife corridor between North and South America, thus wildlife transfers between North and South America are largely dependent on the viability of this region (Goodwin 2000, Valdez et al. 2006). The Lower Rio Grande Valley Region between the United States (U.S.) and Mexico, in particular, offers critical habitat important to North American migratory species (Yong and Finch 1997, Goodwin 2000). This region also houses significant industrial and agricultural activities with both benefits and consequences to the host population (see Introduction). Working lands, maquiladoras, pollution, urban sprawl, *colonias*, and high population turnover coupled with sociodemographic, sociopolitical and sociocultural differences in the region make

the U.S—Mexico borderlands a prime example of a natural resource-human dimensions hot zone. This critical region is influenced by three major population groups: Mexicans, U.S. Latinos, and U.S. non-Latino whites. Like their U.S. Latino counterparts, Mexicans lag behind in education completion (Diaz Bautista 2003) and share similar geopolitical histories *vis* a *vis* Spanish conquest, defeat in war with U.S., and the prevalence of poverty. Although Latinos on both sides of the border share many similarities, they nevertheless are two distinct populations. Differences notwithstanding, very little is known about their attitudes toward natural resources and the environment, and specific comparisons between the three major border stakeholders (Mexicans, U.S. Latinos, and U.S. non-Latino whites) have not yet been made. Thus, the objectives of my study were (1) to determine natural resource and environmental attitudes along the U.S.–Mexico border region by surveying college and university students who are Mexican, U.S. Latino, and U.S. non-Latino white and (2) to gain a clearer understanding of the role sociodemographic and sociopolitical variables play on environmental knowledge, attitudes, and behavior in this border region.

STUDY AREA

Mexico Study Area

In Mexico, I surveyed community college and university students from eight academic institutions: Tecnológico de Monterrey, Campus Ciudad Juarez (Ciudad Juarez, Chihuahua); Universidad Autónoma de Coahuila, Unidad Norte (Piedras Negras, Coahuila); Universidad Autónoma del Noreste (Piedras Negras, Coahuila); Universidad Autónoma de Piedras Negras (Piedras Negras, Coahuila); Universidad Autónoma de

Tamaulipas, Unidad Reynosa (Reynosa, Tamaulipas); Universidad Mexico Americana del Norte, A.C., (Ciudad Reynosa, Tamaulipas); Universidad Pedagógica Nacional (Piedras Negras, Coahuila); Universidad Valle del Bravo, Campus Nuevo Laredo (Nuevo Laredo, Tamaulipas). I was interested in sampling only college students because I wanted to control for education as an independent variable. I selected these community colleges and universities based on their location near and along the U.S.–Mexico border. Thus, my study sample was a purposive sample (Babbie 1990); it focused exclusively on identifying the natural resource and environmental attitudes of educated Mexicans who lived near or along the United States–Mexico border.

United States Study Area

I surveyed Texas Latino community college and university students from seven academic institutions: Coastal Bend Community College (Alice, TX); Coastal Bend Community College (Beeville, TX); Coastal Bend Community College (Kingsville, TX); El Centro Community College (Dallas, TX); El Paso Community College (El Paso, TX); and University of Texas at Brownsville (Brownsville, TX). Like with the Mexican sample, I was interested in sampling only college students thus controlling for education as an independent variable. I selected these community colleges and universities because they were located in highly Latino-populated areas (Hispanic Serving Institutions, >50% Latino students). As with the Mexican sample, the U.S. sample in my study was a purposive sample (Babbie 1990) because it focused exclusively on identifying the natural resource and environmental attitudes of educated Texas Latinos of Mexican descent.

METHODS

Survey Development

I derived an index of environmental concern consisting of questions from three commonly used indices of environmental concern: General Social Survey (2003), New Ecological Paradigm (NEP; Dunlap et al. 2000), and the Texas Biennial Environmental Survey (Klineberg 1998a, b). For the purposes of this paper, I will focus on my findings from the NEP scale. I selected 15 questions based on their consistency across the three commonly used indices and their relevance to regional, cultural, language, and social characteristics of the target population (Table 2.1). Responses for the NEP were in Likert format (1–5) with 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, and 5 = strongly disagree. I divided the variables included in my survey into two categories: sociodemographic and sociopolitical. Several sociodemographic (ethnicity, religious preference, religious participation, etc.) and sociopolitical (political party affiliation, political participation, etc.) questions were deemed either out of context due to language differences or discriminatory towards Mexicans and were omitted from my Mexican survey. Sociodemographic variables included (1) ethnicity (Latino, non-Latino; used only with the Texas population), (2) sex (M, F), (3) age (≤20 yr, 21-30 yr, 31-40 yr, 41-50 yr, ≥51 yr), (4) combined parent income (≤$9,999, $10,000-24,999, $25,000-

Table 2.1. New Ecological Paradigm survey questions used in determining Latino environmental concern among Texas, USA, and Mexico students (*n* = 15; Likert format[a]), 2010.

Questions
1. We worry too much about the future of the environment and not enough about prices and jobs today.
2. People worry too much about human progress harming the environment.
3. There are more important things to do in life than protect the environment.
4. Many of the claims about environmental threats are exaggerated.
5. Too much emphasis these days on conserving resources, not enough on using them for current needs.
6. Humans do not need to adapt to the natural environment because they can change it to suit their needs.
7. We humans are approaching the limits of earth's room and resources.
8. To help solve the earth's environmental problems, the U.S. and other rich countries will have to reduce their consumption of resources.
9. When humans change the natural environment, it often produces disastrous results.
10. We are not harming the environment when we do normal things, like driving cars and running air conditioners.
11. People worry too much about threats to the global environment.
12. Plants and animals exist primarily to be used by humans.
13. There is no point in doing what I can for the environment unless others do the same.
14. It is too difficult for someone like me to do much about the environment.
15. I do what is right for the environment, even when it costs more money or takes up more time.

[a] 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

49,999, $50,000-74,999, $75,000-109,999, ≥$110,000; an equivalent scale was used in Mexican currency based on the current market currency rate, $10 Mexican pesos to $1 United States Dollar, 2006), (5) father's education level (less than a high school diploma, high school diploma, technical school and/or some college, college degree, and graduate degree), (6) mother's education level (scale identical to father's education), and (7) place of origin (Texas Latino, Texas non-Latino white, and Mexican). Sociopolitical variables included (1) environmental orientation (active environmentalist, sympathetic, neutral, unsympathetic, don't know), and (2) political candidate's position on environmental issues (very important, somewhat important, not very important). The survey was translated into Spanish and then reviewed by Mexican university professors and their graduate students as part of a collaborative USDA grant project. Texas A&M University's Institutional Review Board (protocol no. 2005-021) approved study protocols.

Data Collection

In Spring 2005, I compiled e-mail addresses for all faculty at academic institutions in Texas targeted in my survey. I sent an email message, requesting assistance in conducting my survey during regularly scheduled class times, to all faculty members. Faculty members that responded to the initial e-mail contact and that agreed to participate chose to administer the surveys themselves. I sent each participating faculty member the survey protocol for conducting the survey and an informed consent form for each student participant, along with the appropriate number of surveys, and a prepaid return envelope. In Fall 2006 , I collaborated on a USDA project grant and

worked with Texas and Mexico university professors and graduate students. Mexican professors and graduate students were familiarized with the study's objectives and methodology. Participating Mexican profressors and graduate students also reviewed the survey intstrument to insure proper translation. Mexican professors and graduate students then distributed and collected surveys from various universities along the U.S. – Mexico border.

Data Analysis

I conducted a reliability analysis of the NEP using SPSS (Version 15.0, Chicago, IL). The survey reliability analysis found the scale to be appropriate (Gall et al. 2003, Cronbach's Alpha = 0.687). For the Texas population, I selected surveys where respondents identified themselves as Latino for the Latino population and as non-Latino white for the non-Latino white population. I used the selected surveys for further analyses. I calculated an NEP score for each population, and compared the level of environmental concern (NEP, determined by summation and reverse summation of each participant's response to 15 environmental concern questions) among all three populations to nine sociodemographic variables using ordinal logistical regression in SPSS. I calculated odds ratios for significant ($P < 0.05$) model variables (Hosmer and Lemeshow 2000). The odds ratio is one set of odds divided by another. For example, an odds ratio of 2.5 for men (gender is the predictor) in having a heart attack (response variable) is 2.5 times greater when compared to women (Hosmer and Lemeshow 2000). In other words, the odds ratio compares one unit of change in one predictor relative to another.

RESULTS

Surveys Collected

For the Texas population, I mailed surveys (n = 1,353) to 27 Texas community college and university professors who were willing to participate in the study. Of these, seven professors did not return surveys and 20 professors returned completed surveys (n = 755, final response rate 56%). Of the 755 surveys received, 16% (n = 120) were from non-Latino participants. This non-Latino group was further divided into two groups: non-Latino white (n = 75) and other (n = 45). The sociodemographic profile for the non-Latino white participants was as follows: age (mean =27.86 yr, SD = 9.69), gender (69%F), classification (30% freshman, 35% sophomore, 15% junior, 15% senior, 5% other), and combined parental income (median = $75,000-109,000 USD, n = 48). The remaining surveys (84%, n = 635) were from Latino participants whose sociodemographic profile was as follows: age (mean =25.21 yr, SD = 7.90), gender (69%F), classification (25% freshman, 39% sophomore, 21% junior, 12% senior, 3% other), and combined parental income (median = $25,000-49,999 USD, n = 420).

For the Mexican population, eight universities were randomly selected from among all universities near or on the Mexico–Texas, United States border region, and within the selected universities, 284 students were randomly selected. Because Mexico universities vary in their organizational, administrative and procedural structure, Mexico university professors and graduate students obtained 100% participant compliance. The sociodemographic profile for the Mexican participants was the following: age (mean =21.88 yr, SD = 4.39), gender (55%F), classification (21% freshman, 32% sophomore,

22% junior, 19% senior, 6% other), and combined parental income (median = $9,999 USD and under, *n* = 247).

Predictors of Environmental Concern

Combined Population.—When all three populations were combined, only five variables were important in predicting environmental concern among the combined population (Texas Latino, Texas non-Latino whites, and Mexicans): *sex* (male, $P < 0.001$, Table 2.2, Figure 2.1), *environmental orientation* (don't know, $P = 0.035$; neutral, $P = 0.029$; Table 2.2, Figure 2.2), *political candidate's position on environmental issues* (very important, $P = 0.003$, Table 2.2, Figure 2.3), *father's educational attainment* (high school diploma, $P = 0.036$; technical school and/or some college, $P = 0.049$; college degree, $P = 0.041$, Table 2.2, Figure 2.4), and *place of origin* (Mexicans, $P < 0.001$, Table 2.2, Figure 2.5). With respect to *sex,* survey findings indicate that females had greater (≈ 1.599 odds) environmental concern when compared to males (Table 2.2). Respondents who did not have a specific *environmental orientation* had lower levels of environmental concern when compared to those who did have a specific environmental orientation (don't know, ≈ 2.144 odds; neutral, ≈ 2.048 odds; Table 2.2). Survey respondents that identified a *political candidate's position on environmental issues* as important had a greater environmental concern (≈ 1.653 odds) than those who did not consider it to be important (Table 2.2). The respondents' NEP values increased as their *father's educational attainment* increased (high school diploma, ≈ 1.630 odds; technical school and/or some college, ≈ 1.526 odds; college degree, ≈ 1.590 odds; Table 2.2). Finally, regarding *place of origin*, I found that Mexican respondents were more odds

likely (≈ 2.358 odds) to have higher levels of environmental concern than their Texas Latino and non-Latino white counterparts (Table 2.2).

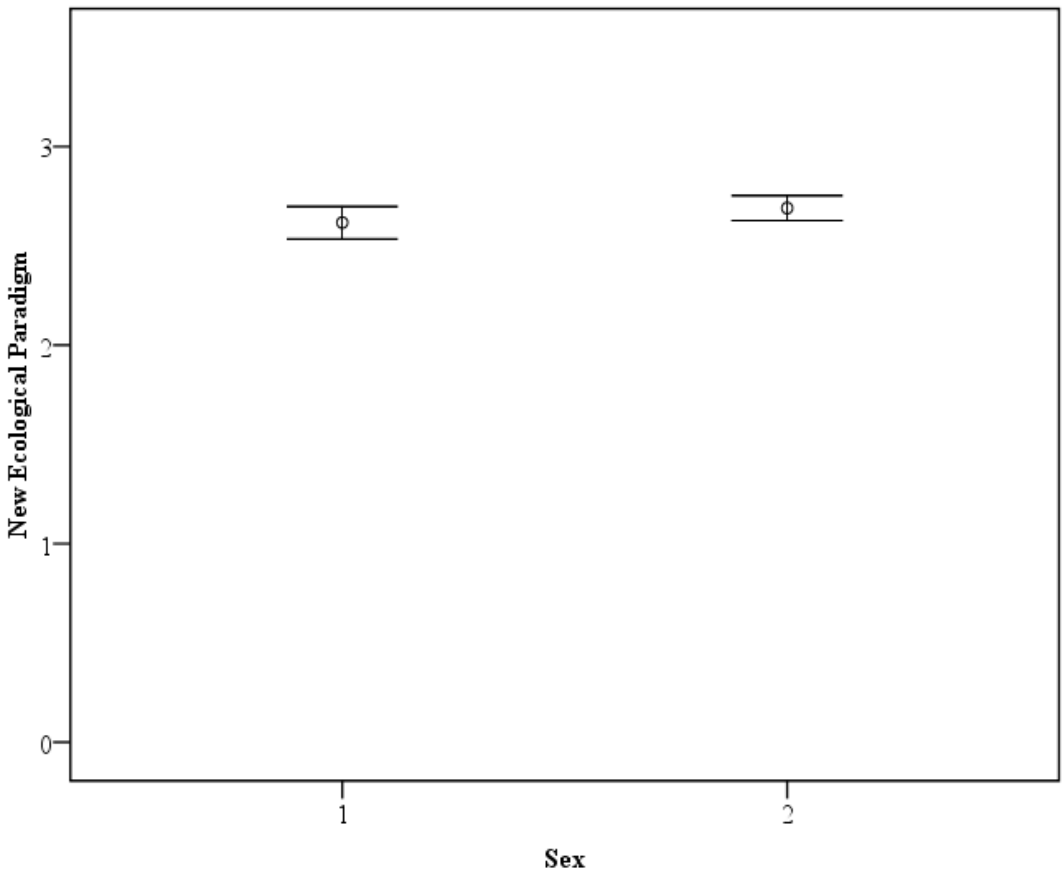
Table 2.2. Model parameter estimates for significant ($P < 0.05$) variables by combined population for environmental concern measured by New Ecological Paradigm scale, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Sex					
Male	-0.470	<0.001*	1.599	-0.695	-0.244
Female	0	-	-	-	-
Environmental Orientation					
Don't Know	-0.763	0.035*	2.144	-1.472	-0.055
Active	-0.187	0.641	1.205	-0.973	0.599
Sympathetic	-0.104	0.751	1.109	-0.749	0.541
Neutral	-0.717	0.029*	2.048	-1.362	-0.072
Not Sympathetic	0	-	-	-	-
Political Candidate's Environmental Position					
Very Important	0.503	0.003*	1.653	0.175	0.832
Somewhat Important	-0.032	0.829	1.032	-0.325	0.261
Not At All Important	0	-	-	-	-

Table 2.2. Continued.

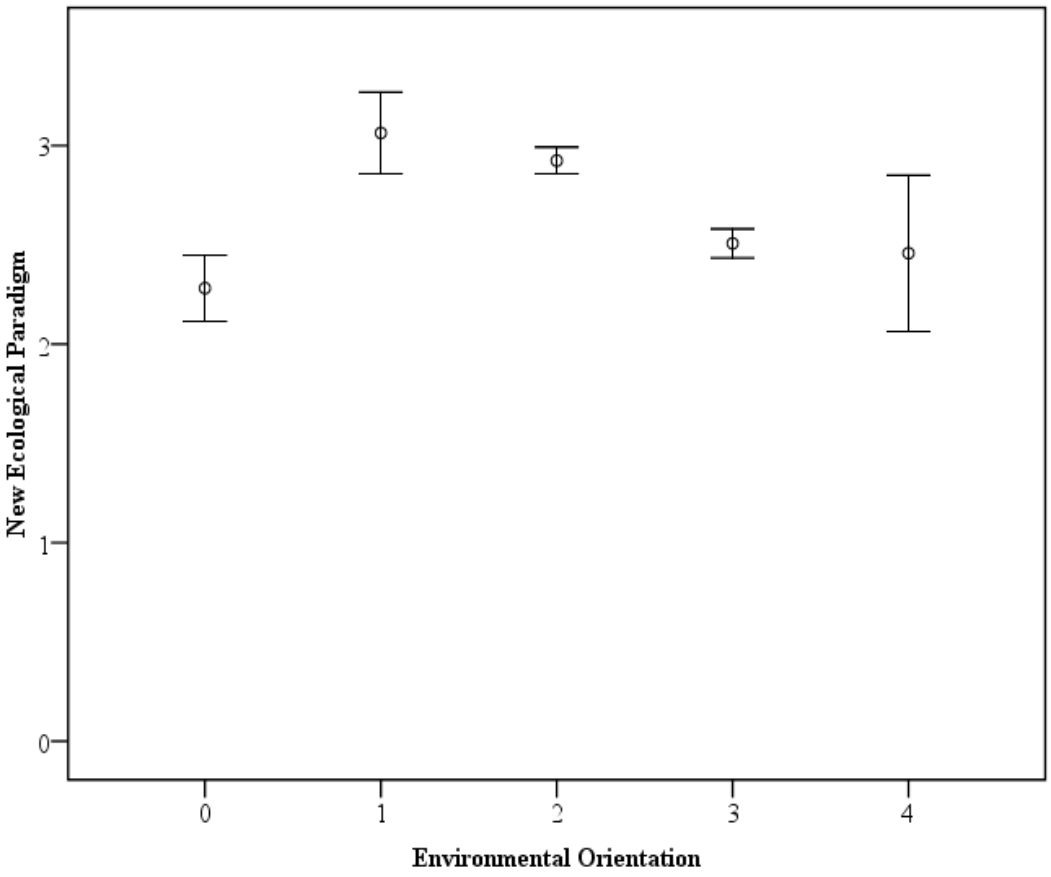
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Father's Educational Attainment					
Less than a High School Diploma	-0.382	0.066	1.465	-0.790	0.025
High School Diploma	-0.489	0.036*	1.630	-0.947	-0.032
Technical School and/or Some College	-0.423	0.049*	1.526	-0.845	-0.001
College Degree	-0.464	0.041*	1.590	-0.910	-0.018
Graduate Degree	0	-	-	-	-
Population Origin					
Mexicans	0.858	< 0.001*	2.358	0.363	1.353
Texas Latinos	0.213	0.319	1.237	-0.206	0.632
Texas non-Latino whites	0.213	0.319	1.237	-0.206	0.632

*Significant at $P<0.05$ for comparisons among model variables.



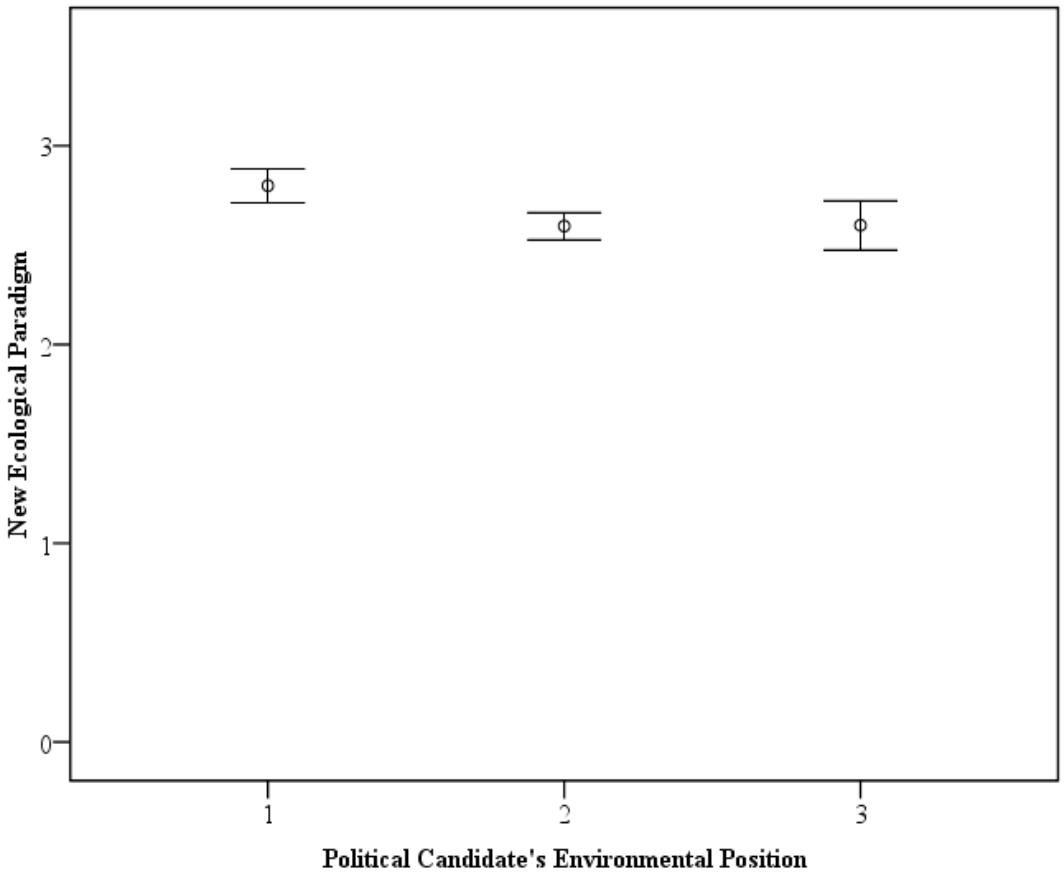
1=Male, 2=Female

Figure 2.1. New Ecological Paradigm (NEP) mean score for combined population by sex, 2010.



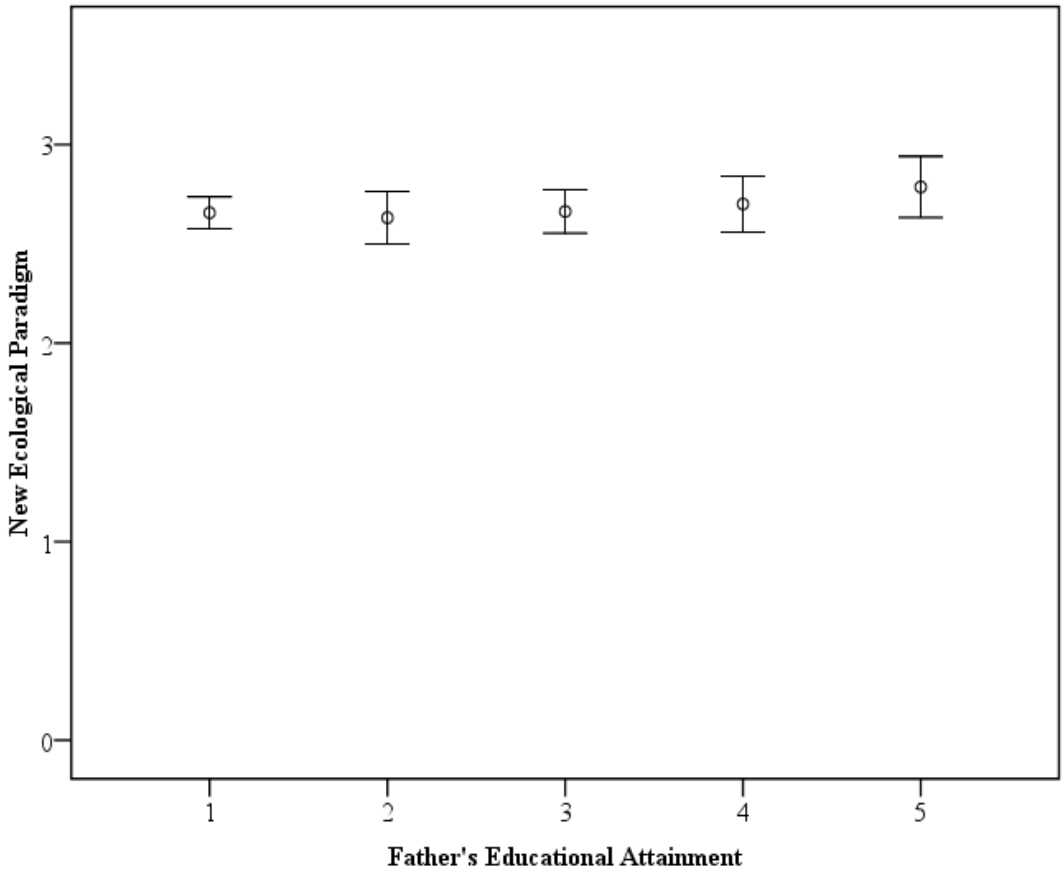
0=Don't Know, 1=Active, 2=Sympathetic, 3=Neutral, 4=Unsympathetic

Figure 2.2. New Ecological Paradigm (NEP) mean score for combined population by environmental orientation, 2010.



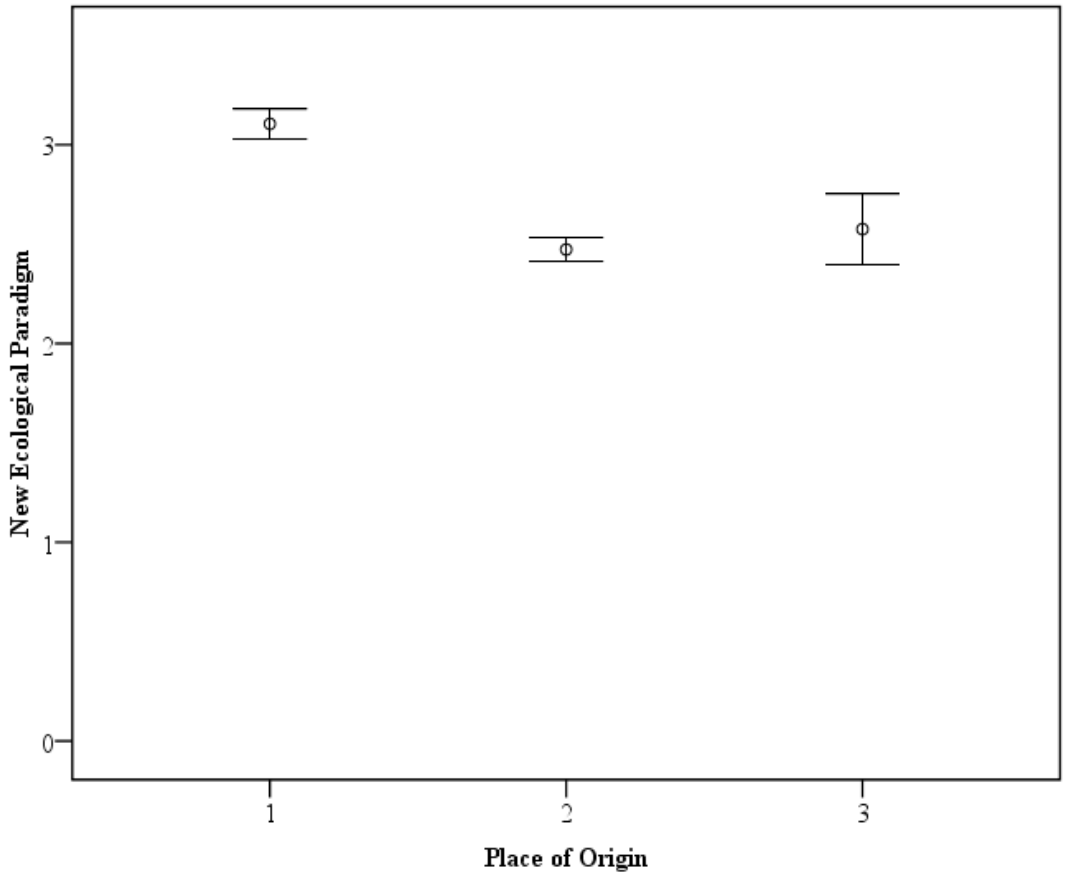
1=Very Important, 2=Somewhat Important, 3=Not at all Important

Figure 2.3. New Ecological Paradigm (NEP) mean score for combined population by political Candidate's Environmental Position, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate/Professional Degree

Figure 2.4. New Ecological Paradigm (NEP) mean score for combined population by father's educational attainment, 2010.



1=Mexicans, 2=Texas Latinos, 3=Texas non-Latino whites

Figure 2.5. New Ecological Paradigm (NEP) mean score for combined population by Place of Origin, 2010.

Mexicans.—The Mexican student sample was influenced by three independent variables (not including place of origin as a variable). The following factors were important in predicting environmental concern: *age* (20 or younger, $P = 0.004$; 21-30 years, $P = 0.004$; 31-40 years, $P = 0.009$; Table 2.3, Figure 2.6), *combined parent income* ($10,000-24,999, $P = 0.004$; Table 2.3, Figure 2.7), and *mother's educational attainment* (high school diploma, $P = 0.016$; technical school and/or some college, $P = 0.014$; Table 2.3, Figure 2.8). Findings with respect to *age* indicate that younger participants had a higher environmental concern (20 or younger, ≈ 2.851 odds; 21–30, ≈ 2.809 odds; 31–40, ≈ 3.145 odds) compared to older participants (Table 2.3). Regarding *combined parent income*, I found that, in general, the very poor ($10,000-24,999, ≈ 1.745 odds; Table 2.3) and the wealthy had a higher environmental concern when compared to middle class participants. Finally, in general, NEP values decreased with an increase in *mother's educational attainment* (high school diploma, ≈ 6.685 odds; technical school and/or some college, 6.404 odds; Table 2.3).

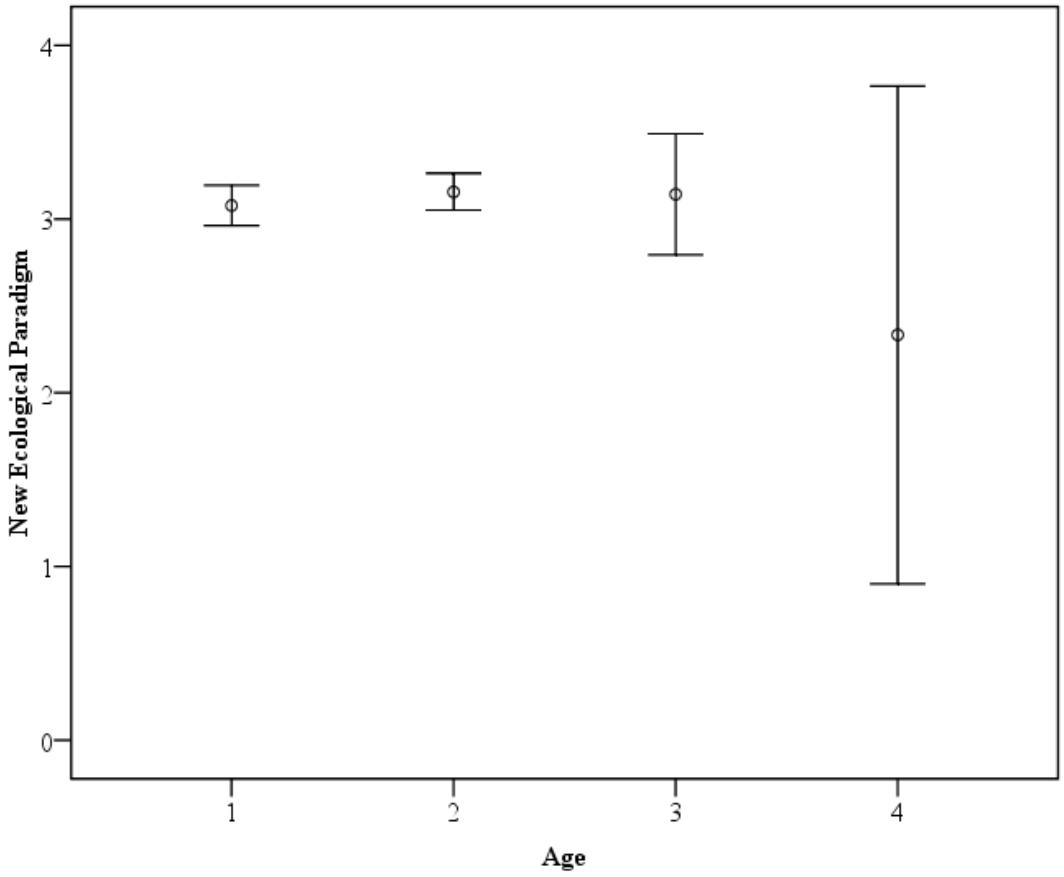
Table 2.3. Model parameter estimates for significant ($P < 0.05$) variables by Mexican population for environmental concern measured by New Ecological Paradigm scale, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Age (years)					
20 or younger	1.048	0.004*	2.851	0.954	5.060
21-30	1.033	0.004*	2.809	0.957	5.007
31-40	1.146	0.009*	3.145	0.770	5.262
41 and older	0	-	-	-	-
Parent Income (U.S. Dollars)					
9,999 and under	0.302	0.848	1.352	-0.535	0.651
10,000-24, 999	0.557	0.004*	1.745	-2.699	-0.514
25,000-49,999	0.581	0.584	1.787	-1.458	0.822
50,000-74,999	0.828	0.147	2.288	-2.822	0.423
75,000-109,999	1.106	0.875	3.022	-1.994	2.343
110,000 or more	0.532	0.305	1.702	-0.497	1.587
Don't Know	0	-	-	-	-
Mother's Educational Attainment					
Less than a High School Diploma	1.350	0.064	3.857	-0.081	2.780
High School Diploma	1.900	0.016*	6.685	0.355	3.444

Table 2.3. Continued.

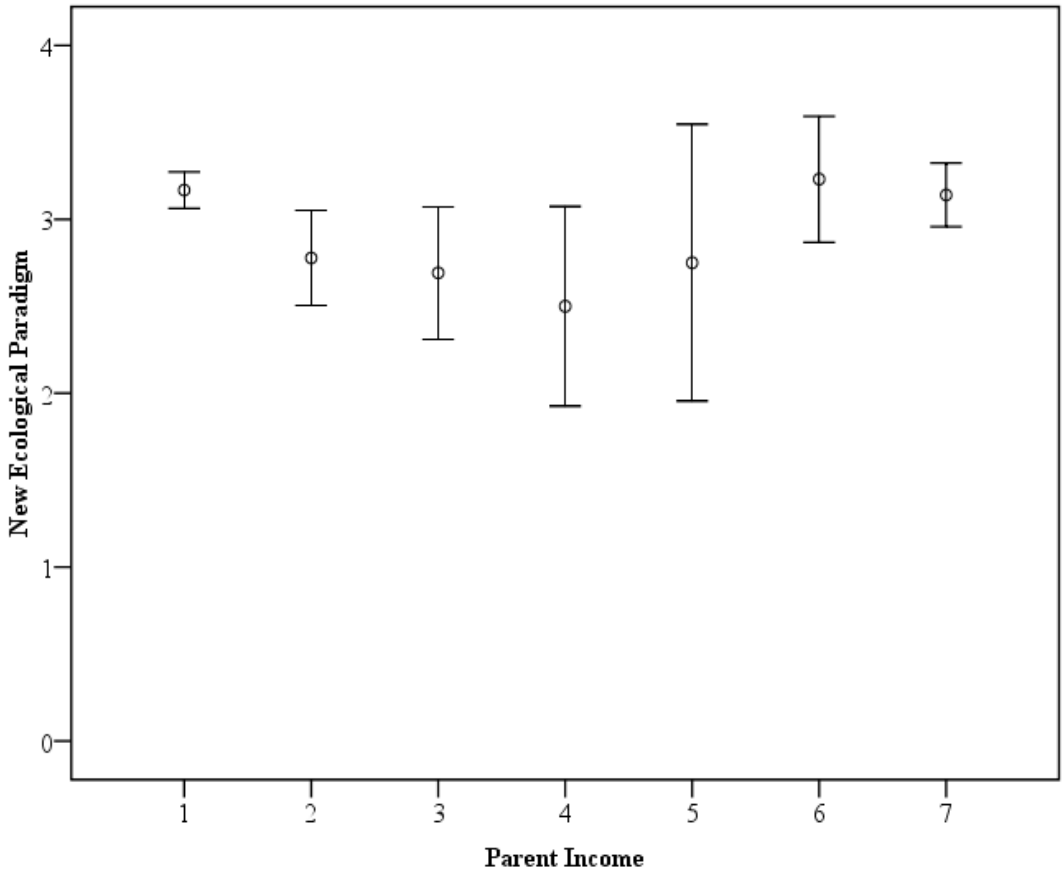
Variable *Category*	β	*P**	Odds Ratio	95% LCL	95% UCL
Technical School and/or Some College	1.857	0.014*	6.404	0.372	3.341
College Degree	0.973	0.197	2.645	-0.505	2.451
Graduate Degree	0	-	-	-	-

*Significant at $P<0.05$ for comparisons among model variables.



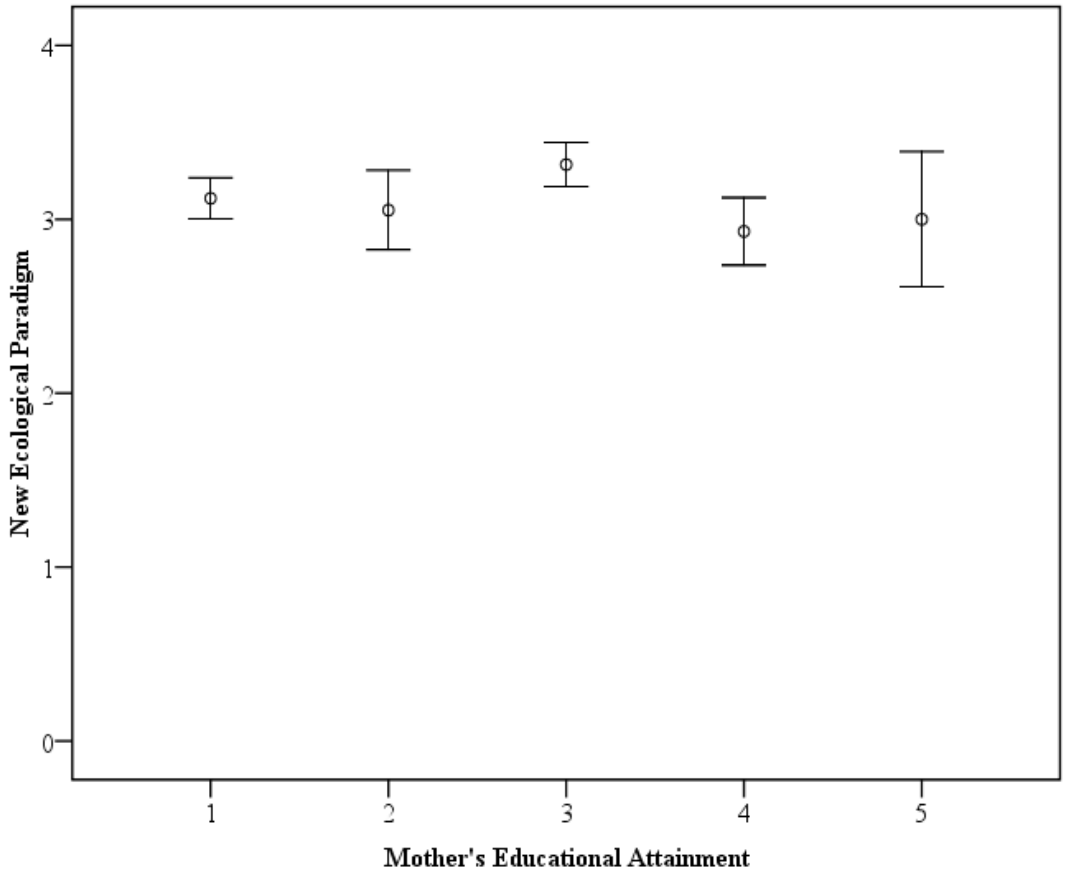
1=20 or younger, 2=21-30, 3=31-40, 4=41-50, 5=51 or older

Figure 2.6. New Ecological Paradigm (NEP) mean score for Mexicans by age, 2010.



1=$9,999 and under, 2=$10,000-24,999, 3=$25,000-49,999, 4=$50,000-74,999, 5=$75,000-109,999, 6=$110,000 and over, 7=I don't know

Figure 2.7. New Ecological Paradigm (NEP) mean score for Mexicans by parent income, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate/Professional Degree

Figure 2.8. New Ecological Paradigm (NEP) mean score for Mexicans by mother's educational attainment, 2010.

Texas Latinos.—Of the eight independent variables tested (not including place of origin as a variable) for predicting NEP scores, only four were important in predicting environmental concern among my sample of Texas Latino students: *sex* (male, $P < 0.001$; Table 2.4, Figure 2.9), *environmental orientation* (don't know, $P = 0.027$; neutral, $P = 0.024$; Table 2.4, Figure 2.10), *political candidate's position on environmental issues* (very important, $P = 0.013$; Table 2.4, Figure 2.11), *father's educational attainment* (less than high school, $P = 0.036$; high school diploma, $P = 0.017$; technical school and/or some college, $P = 0.040$; college degree, $P = 0.025$; Table 2.4, Figure 2.12). With respect to *sex*, study findings indicate that female respondents had higher levels of environmental concern (≈ 1.748 odds) when compared to male respondents (Table 2.4). Respondents who had not developed a specific *environmental orientation* (don't know, ≈ 2.559 odds; neutral, ≈ 2.440 odds) scored lower on the environmental concern scale than their counterparts (Table 2.4). Survey respondents that identified a *political candidate's position on environmental issues* as important had a greater

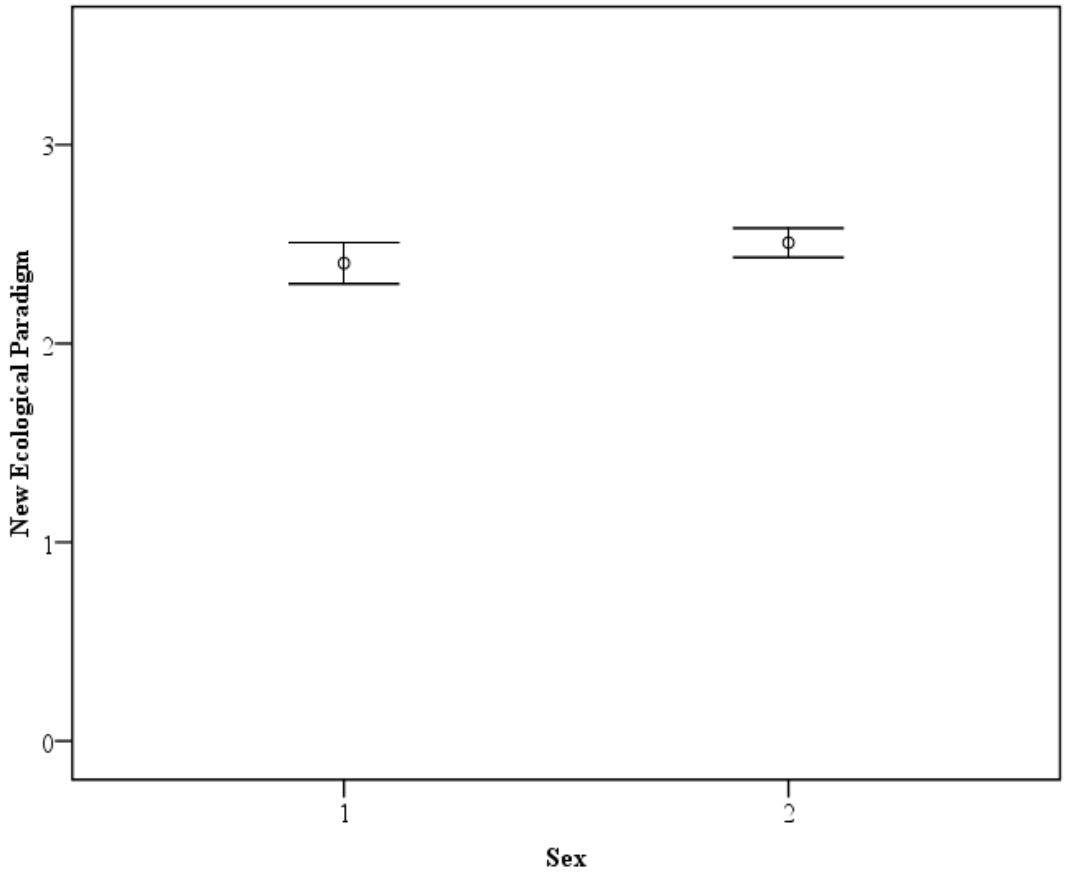
Table 2.4. Model parameter estimates for significant ($P < 0.05$) variables by Texas Latino population for environmental concern measured by New Ecological Paradigm scale, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Sex					
Male	-0.559	<0.001*	1.748	-0.857	-0.261
Female	0	-	-	-	-
Environmental Orientation					
Don't Know	-0.940	0.027*	2.559	-1.771	-0.109
Active	-0.681	0.214	1.975	-1.756	0.394
Sympathetic	-0.187	0.636	1.205	-0.959	0.586
Neutral	-0.892	0.024*	2.440	-1.667	-0.116
Not Sympathetic	0	-	-	-	-
Political Candidate's Environmental Position					
Very Important	0.527	0.013*	1.693	0.111	0.942
Somewhat Important	0.022	0.906	1.022	-0.349	0.394
Not At All Important	0	-	-	-	-
Father's Educational Attainment					
Less than a High School Diploma	-0.588	0.036*	1.800	-1.138	-0.039
High School Diploma	-0.729	0.017*	2.073	-1.326	-0.132

Table 2.4. Continued.

Variable *Category*	β	*P**	Odds Ratio	95% LCL	95% UCL
Technical School and/or Some College	-0.586	0.040*	1.796	-1.146	-0.025
College Degree	-0.751	0.025*	2.119	-1.410	-0.092
Graduate Degree	0	-	-	-	-

*Significant at $P<0.05$ for comparisons among model variables.



1=Male, 2=Female

Figure 2.9. New Ecological Paradigm (NEP) mean score for Texas Latinos by sex, 2010.

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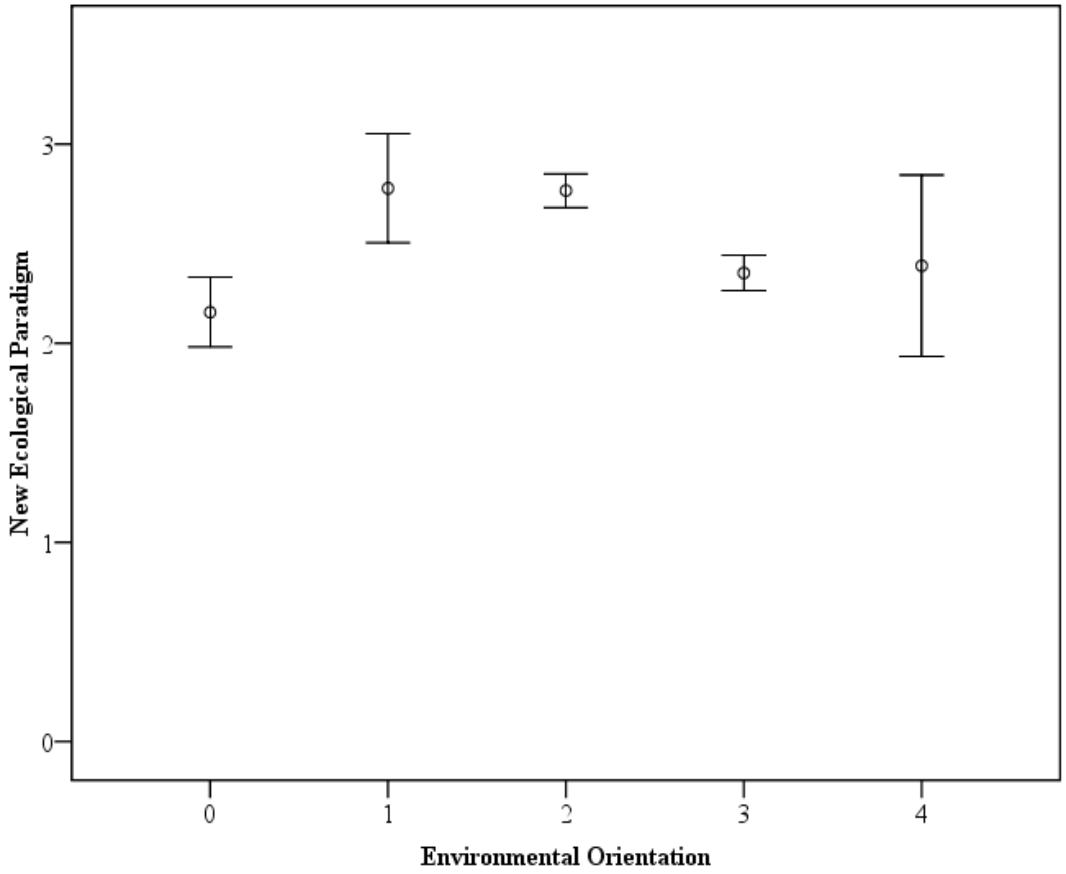
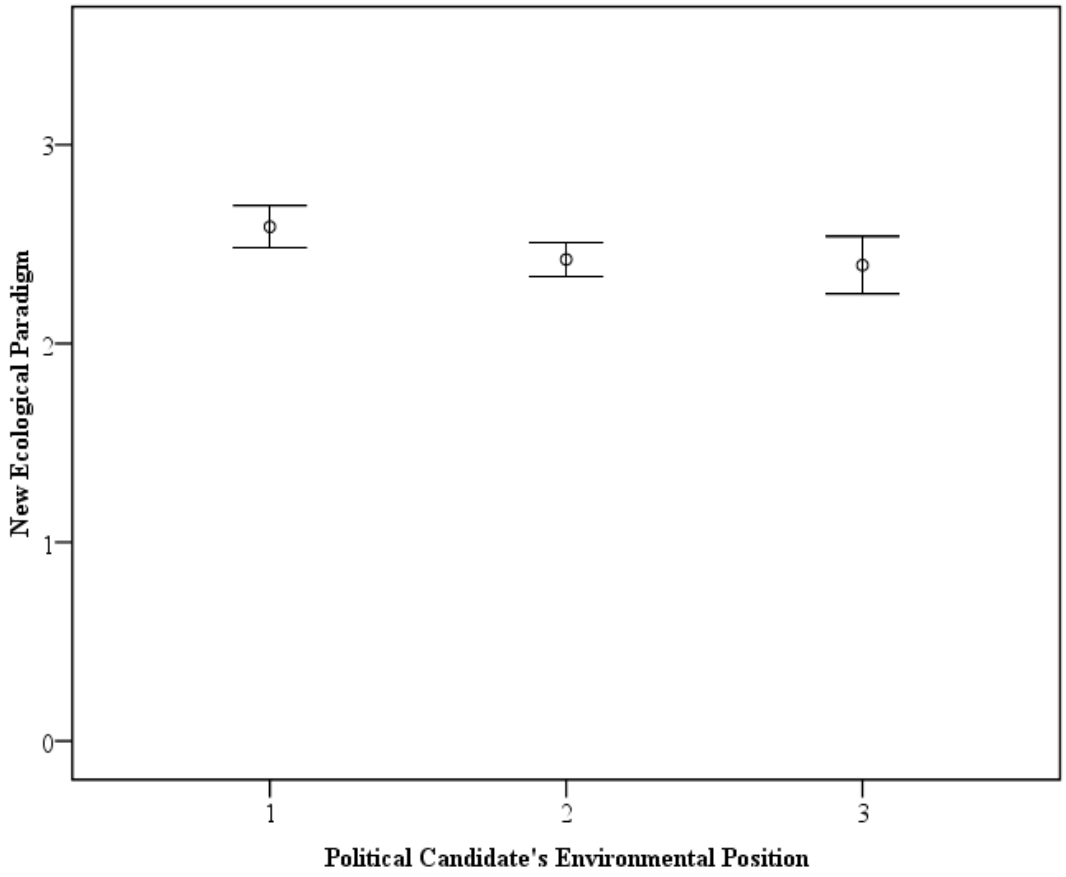


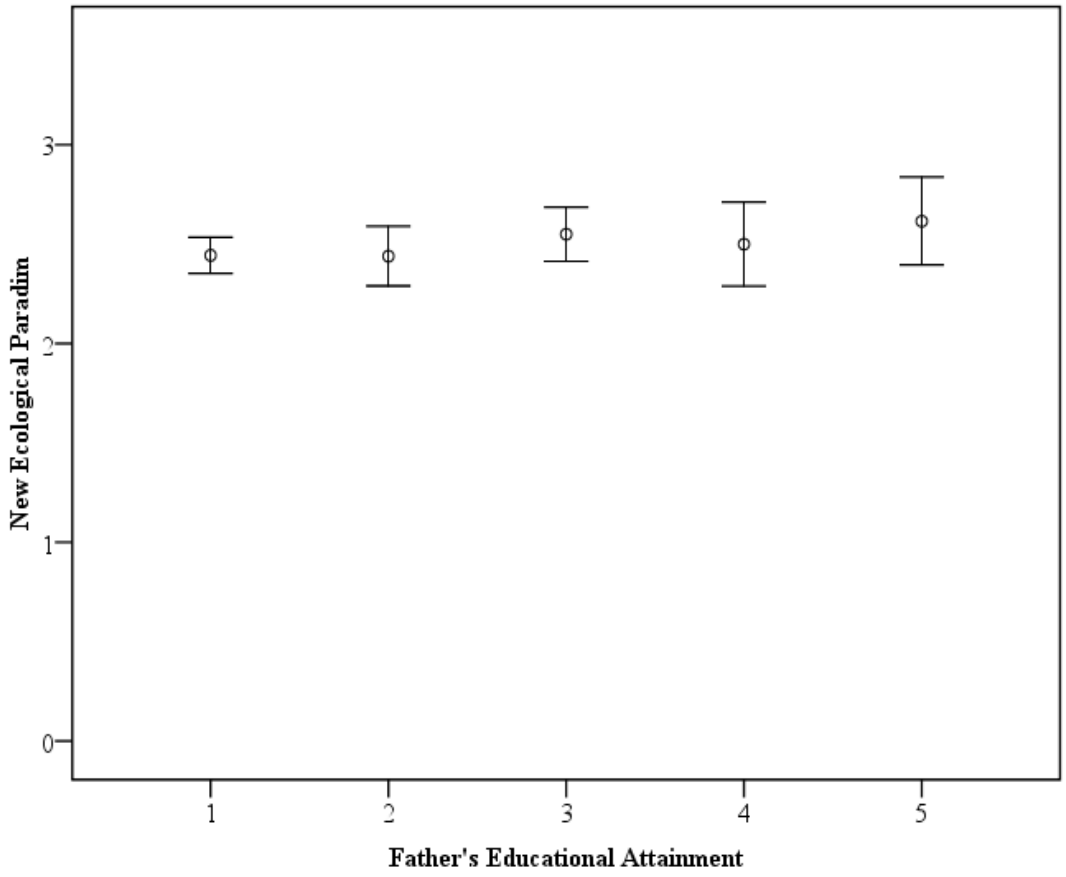
0=Don't Know, 1=Active, 2=Sympathetic, 3=Neutral, 4=Unsympathetic

Figure 2.10. New Ecological Paradigm (NEP) mean score for Texas Latinos by environmental orientation, 2010.



1=*Very Important, 2=Somewhat Important, 3=Not at all Important*

Figure 2.11. New Ecological Paradigm (NEP) mean score for Texas Latinos by political candidate's environmental position, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate/Professional Degree

Figure 2.12. New Ecological Paradigm (NEP) mean score for Texas Latinos by father's educational attainment, 2010.

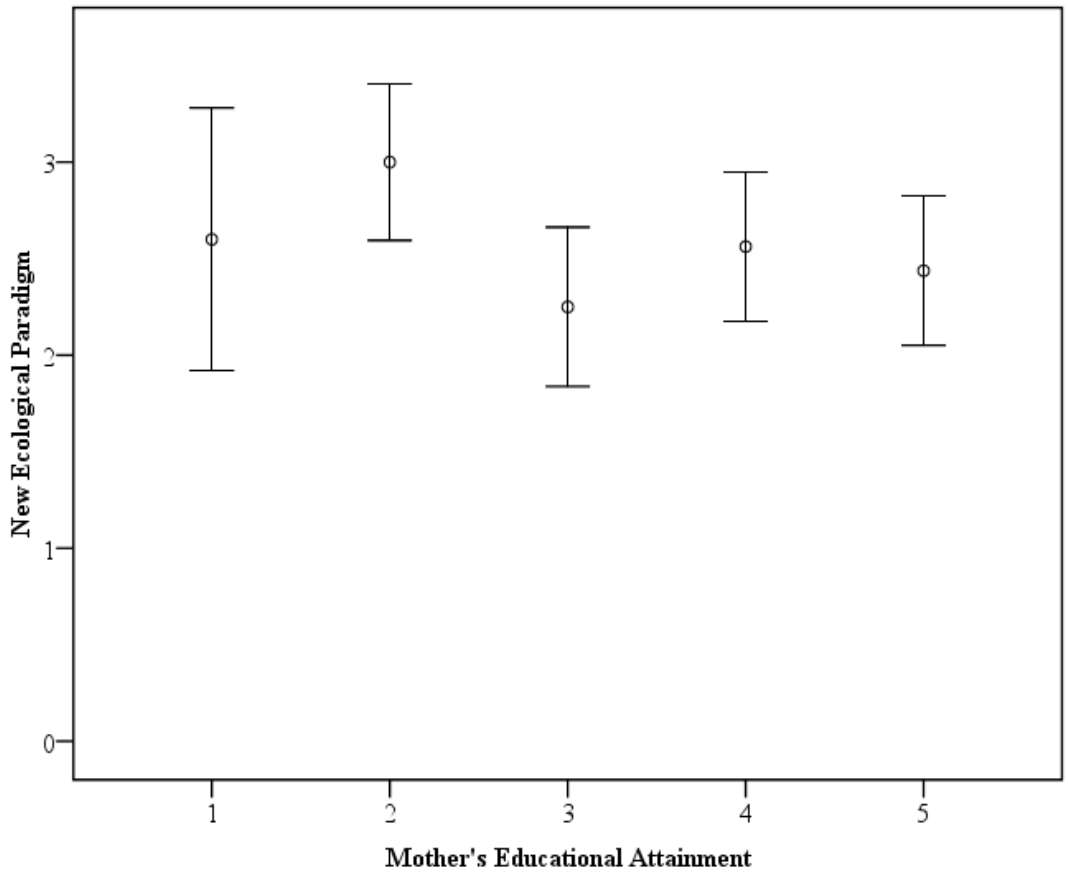
environmental concern (≈ 1.693 odds) than those who did not consider it to be important (Table 2.4). Finally, as illustrated in Table 2.4, NEP values increased with an increase in *father's educational attainment* (less than high school, ≈ 1.800 odds; high school diploma, ≈ 2.073 odds; technical school and/or some college, ≈ 1.796 odds; college degree, ≈ 2.119 odds).

Texas non-Latino Whites.—Only two independent variables (not including place of origin as a variable) were important in predicting environmental concern among my sample of Texas non-Latino white college students: *mother's* (college degree, P = 0.031) and *father's educational attainment* (less than high school, P = 0.022; Table 2.5, Figure 2.13 and Figure 2.14, respectively). Survey results indicate, in general, that as *mother's educational attainment* increased, the odds likelihood of environmental concern decreasing in their children is greater than for those children whose mothers are less educated (≈ 9.954 odds; Table 2.5). In general, as *father's educational attainment* decreased, the odds likelihood of environmental concern decreasing is greater than for those whose fathers are more educated (≈ 40.731 odds; Table 2.5).

Table 2.5. Model parameter estimates for significant ($P < 0.05$) variables by Texas non-Latino white population for environmental concern measured by New Ecological Paradigm scale, 2010.

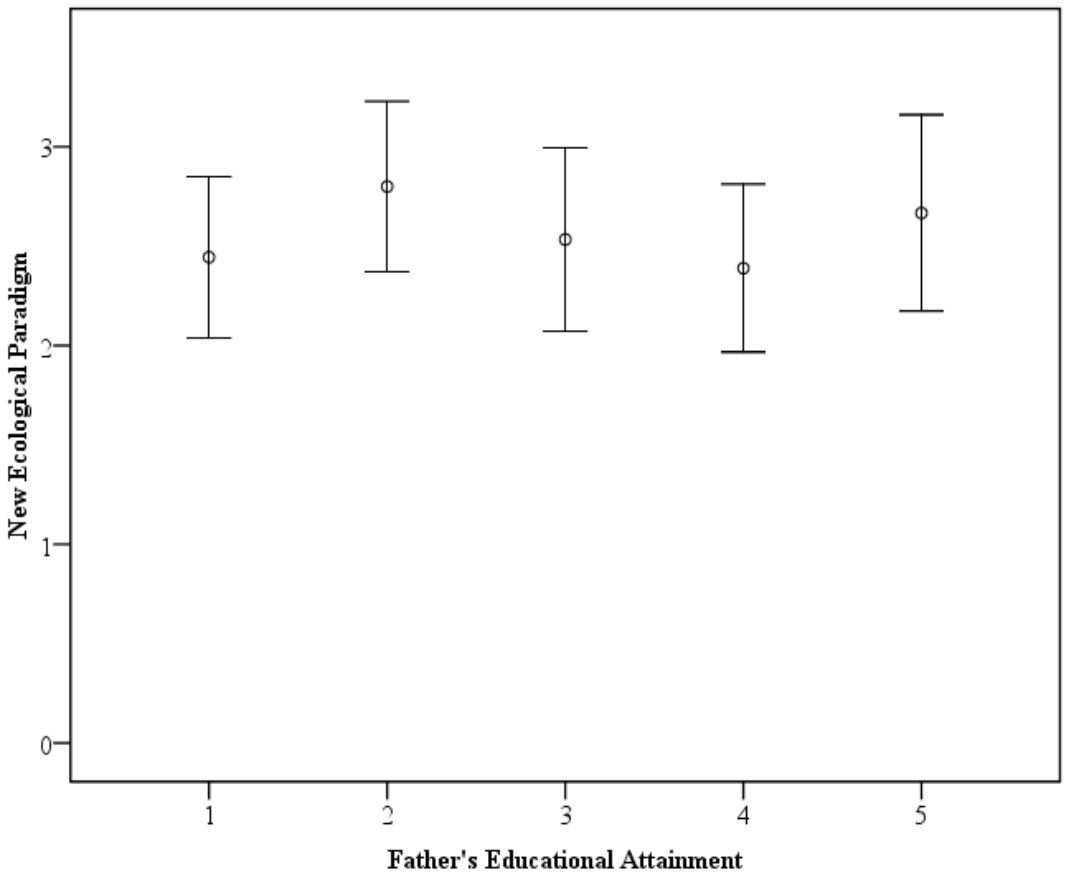
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Mother's Educational Attainment					
Less than a High School Diploma	1.433	0.367	4.191	-1.680	4.545
High School Diploma	1.814	0.199	6.134	-0.952	4.579
Technical School and/or Some College	0.591	0.606	1.805	-1.651	2.832
College Degree	2.298	0.031*	9.954	0.205	4.391
Graduate Degree	0	-	-	-	-
Father's Educational Attainment					
Less than a High School Diploma	-3.707	0.022*	40.731	-6.887	-0.528
High School Diploma	-1.872	0.207	6.501	-4.780	1.036
Technical School and/or Some College	-2.805	0.071	16.527	-5.848	0.238
College Degree	-0.715	0.493	2.044	-2.757	1.327
Graduate Degree	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate/Professional Degree

Figure 2.13. New Ecological Paradigm (NEP) mean score for Texas non-latino whites by mother's educational attainment, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate/Professional Degree

Figure 2.14. New Ecological Paradigm (NEP) mean score for Texas non-Latino whites by father's educational attainment, 2010.

DISCUSSION

Combined Population

When I combined the three population groups (Mexican, Texas Latino, and Texas non-Latino white), I found that college students' environmental attitudes were associated with both sociodemographic (*sex*, *father's educational attainment*, and *place of origin*) and sociopolitical (*environmental orientation* and *political candidate's environmental position*) variables. Sociodemographic variables pertinent to my study are discussed and followed by a discussion of relevant sociopolitical variables.

Sociodemographic findings from my study are congruent if not similar to previous studies in the area of environmental attitudes. *Sex* has consistently influenced environmental concern across populations in many studies (Bradley et al. 1997, Earle 1998, and Klineberg et al. 1998, Lopez et al. 2007). My findings are congruent with these findings. On average, females tended to have higher environmental attitudes than males; thus if a natural resource agency wishes to gain support for environmental initiatives that promote environmental stewardship, women are more odds likely to be responsive to such programs. There are slightly more women (52%) than men in the Lower Rio Grande Valley, and this may be favorable to implementing natural resource conservation initiatives in the area (2008 U.S. Census), especially since Latinas are pursuing higher education at a faster rate than Latino males (US Census Bureau 2009). Higher education has consistently been associated with greater proenvironmental attitudes.

Participant *father's educational attainment* influenced their (the students') environmental attitudes. In general, this finding is similar with other study findings (e.g., Klineberg et al. 1998). The results indicate that the higher an individual's educational attainment, the higher their level of environmental concern. Given my results, I hypothesize that as a father's educational attainment increases, so does their child's (participant's) environmental concern. Four factors may influence the environmental concern of these children (participants): home environment (Earle 1998), income (Klineberg 1998), education, and improved access to information via the internet and news programming. Earle (1998) suggests that environmental concern may be a learned behavior, passed from parent to child. Given this analogy, if a father figure has a higher environmental concern, their children are more apt to express greater environmental concern as well.

Income has also been shown to positively influence environmental concern (Klineberg 1998). Higher educational attainment usually means a higher paying job. Consequently, I hypothesize that as income increases (due to a father's higher educational attainment) children in these families somehow develop a greater environmental concern compared to children with fathers who have a lower educational attainment. Currently, only 60.6% male and 63.3% female Texas Latinos complete a high school education, and 12.5% male and 14.0% female Texas Latinos obtain a college degree (US Census Bureau 2009). Increasing educational attainment for Latinos, in general and Latino males specifically, along this border region would appear to have a

positive effect, albeit indirect, on the environment via increased positive environmental attitudes.

An increase in environmental awareness may also be attributed to newer, up-to-date information presented via curricula in schools. The Texas education system has updated the content offered in schools, i.e. textbooks, with newer information about the environment and conservation. I hypothesize that a change in school curriculum and/or textbooks, emphasizing climate change and environmental degradation resulting from human activities might also coincide with the environmental concern of this participant generation. Finally, the environmental attitudes of participants could well have been influenced by increased accessibility to information, via the internet and/or the news media, relating the effects of climate change to human activities. The latter two hypotheses are beyond the scope of my project, so I cannot confirm their correlation; however, they appear quite plausible and are an area for future research to consider.

When *place of origin* was used as an independent variable study findings suggest that Mexicans have a greater environmental concern than both Texas Latinos and Texas non-Latino whites. The reason for this result is unclear and warrants further investigation into specific differences between both countries and the impact these differences have on environmental concern. I hypothesize that Mexican participants scored higher on the environmental concern scale for reasons that are compounded by history; political differences in structure, regulation, and enforcement of environmental laws; positive cultural practices; socioeconomic class status; and proximity to environmental hazards. These issues are discussed below.

Although environmental laws protecting human health were already in existence, between 1970 and 1990 a more comprehensive, stable, and elaborate federal system was developed to monitor and address natural resource events (Valdez 2006). Historically, several changes in political administrations resulted in changes to the structure of government agencies, with the dissolution of some and the creation of others (Valdez 2006). This is relevant because quite possibly, similar in history to natural resource agencies, environmental health laws and their subsequent regulation, a more elaborate and stable system of environmental protection for humans was not in place until the past 30 years. During this time period extensive environmental damage was caused by extensive and increased production due to the North American Free Trade Agreement (NAFTA) activities. This is particularly true along the northern part of Mexico that borders with the United States, where heavy industrialization is causing environmental pollution and negatively impacting human health.

Another compounding factor influencing Mexican participants' environmental concern is history and its impact on socioeconomic class, living conditions, and location. When Mexico was conquered by Spain, indigenous groups, mestizos, mulatos, etc. were discriminated against and were destined to more subservient professions (Lopez 2005). The European class prospered economically while the non-Europeans remained subservient and in poverty. Today, there is a tremendous gap between rich and poor Mexican socioeconomic classes (Romero Navarrete et al. 2005). Genetically, the majority of Mexican individuals are almost 50% Spanish and 50% indigenous in their

genetic makeup (Cerda 2002); therefore, it is mostly class which dictates access to "better and safer" living conditions and residence (Shapiro 2004).

In Mexico, the rich live in the city while the poor live in rural areas or in the outskirts of major cities. Generally, larger cities in Mexico expand and grow as the poor are marginalized and forced to live in *colonias* (Collins 2009), which initially lack access to water, electricity, sanitation, waste management, and public transportation (Collins 2009). As the *colonia* communities continue to grow and expand, over time, the neighboring city incorporates the *colonia* and provides access to sometimes very limited basic services (public transportation, etc.). Location of residence or dwelling becomes a significant factor when the poor are marginalized and forced to live in environmentally hazardous landscapes (Collins 2009, Ward 1999), i.e., *colonias*. These *colonias* and mostly hazardscapes are located in close proximity to environmental pollution or to areas where environmental disasters are likely to occur (flooding, landfills, dumps, etc.). For these reasons, I hypothesize that as colonias are incorporated into larger cities, the city itself, especially its outer rims, develops closer to environmental hazards, thus individuals are in closer proximity to negative environmental events (industrial pollution, etc.) and as their proximity to negative environmental events increases, so does their level of environmental awareness and concern.

My study found that Mexican participants along the U.S.-Mexico border harbor greater environmental concern than their US participant counterparts. This is an important finding because there appears to be a perception in the U.S. that Mexicans are not at all concerned about the environment or pollution along the U.S.-Mexico border.

Thus the U.S. has the perception that efforts to improve environmental conditions along the U.S.-Mexico border are hopeless because Mexicans don't care about the environment and because the U.S. has no control over what occurs in Mexico. My study results illustrate that these perceptions are unfounded.

With regards to *environmental orientation*, respondents having either a neutral environmental orientation or a "don't know" to whether or not they have a specific environmental orientation, on average, had a lower environmental concern score than their counterparts who had either a sympathetic or unsympathetic environmental orientation. This finding seems to indicate that participants, who have not yet formed an environmental orientation either sympathetic or unsympathetic, will be more difficult to engage in environmental discourse than their counterparts who have already formed an environmental orientation, as the latter two groups are more odds likely to have a higher environmental concern score. Interestingly though, participants who responded with "neutral" as their environmental orientation scored higher on the environmental concern scale than individuals who had not yet decided on a specific environmental orientation (don't know). Quite possibly, between the two groups ("neutral" and "don't know" respondents), those with a "neutral" stance might be easier to engage than those who "don't know" where they stand relative to their orientation on the environment.

Finally, respondents who favored *political candidates* with environmentally-friendly agendas were more odds likely to harbor greater environmental concern than their counterparts who did not feel that a political candidate's environmental position was important. As with environmental orientation, those who consider themselves

"somewhat active environmentalists" are more likely to engage in behavior that is more environmentally friendly, that is, voting for politicians who have a positive environmental agenda.

Mexicans

I included eight variables (origin as a variable was omitted from this analysis; see Discussion, Combined Population) in this analysis. Factors that influenced the environmental attitudes of Mexicans in my study were *age*, *combined parent income*, and *mother's educational attainment*. Each sociodemographic variable is discussed below.

On average, with respect to *age*, younger Mexicans have a higher environmental concern than their older counterparts. This finding is congruent with other studies that assess age as a factor in determining environmental attitudes. Previous research determined younger participants are more environmentally concerned than older participants (Klineberg 1998). One plausible explanation could be that with the advancement of technology, the younger generation has greater access to updated information, which is more readily available now than it has been in the past (See Discussion, Combined Population). Environmental awareness has also increased worldwide due in part to information campaigns about global warming (del Valle 2006 and 2010). New information mediums, such as the internet with its increased accessibility to grassroot and unconventional news outlets improves outreach opportunities. Improvements in science and changes to educational curriculum and textbooks might also influence participant environmental attitudes as well (See

Discussion, Combined Population). Younger generations are more apt to engage in the use of these newer information mediums compared to older generations.

Regarding *parents' combined income*, the general trend in the literature indicates that as income increases, so does one's environmental concern. Hence, those with lower incomes score lower on environmental concern scales than their wealthier counterparts (Klineberg et. al, 1998). High environmental concern of the wealthy is often related to Maslow's Hierarchy of Needs, whereby the wealthy are more apt to hover closer to the self-actualization stage. In contrast, those of lower economic classes are not as yet able to afford that luxury. Previous findings notwithstanding, Mexicans in my study, who were very poor or who were very rich scored higher on the environmental concern scale than their middle class counterparts. There seems to be a threshold in the environmental concern and income continuum that once reached, environmental concern decreases and remains at a plateau until a higher income within the middle class bracket is achieved. Once this threshold is surpassed, environmental concern proceeds to increase as income increases to the highest levels or decreases to the lowest levels. Similar findings have been reported in other studies (Lopez et al. 2007). Income dictates access to better living environments (see Discussion, Combined Population), thus it is plausible that the proximity of poorer individuals to environmental hazardscapes influences environmental awareness and concern among participants.

Finally, with respect to *maternal educational influences* on environmental attitudes, I found an inverse relationship between mother's educational attainment and a respondents' environmental concern, that is, as mother's educational attainment

increased, the respondents' environmental concern decreased. If education was an indicator of income earning potential, I would hypothesize that individuals with higher levels of educational attainment hold more proenvironmental attitudes than individuals with lower educational attainment; however, my findings contradict this hypothesis. Research by Earle et al. (1998) suggest that environmental concern is a learned behavior passed on from parent to child. This approach more aptly explains participant environmental concern levels, but it does not clarify the contradictory educational attainment finding, that as a mother's educational attainment (income) increased, environmental concern decreased.

I propose that because income in this study is bimodal for the Mexican population, participants' combined parent income would most likely fall within the middle-class threshold. Middle class students hold lower environmental concern values than students whose parents fall within the lowest or the highest economic classes. Thus, even if a mother's educational attainment is high, it does not automatically mean that the income derived from her higher educational attainment is large enough to surpass the necessary threshold within the middle class bracket to positively impact environmental concern in the participant.

Texas Latinos

Texas Latino college students' environmental attitudes were associated with sociodemographic (*sex* and *father's educational attainment*) and sociopolitical (*environmental orientation* and *political candidate's position on environmental issues*) variables. Each of these relationships is discussed below.

Sex was a significant variable in my study, where females had higher levels of environmental concern when compared to males. My findings for *sex* were congruent with findings reported by Bradley et al. (1997), Earle (1998), and Klineberg et al. (1998). Knowing that sex is a significant factor influencing environmental attitudes is useful to natural resource agencies trying to implement a new policy or program. Targeting women may yield favorable results since my study findings suggest that compared to men, women would be more receptive to programs or policies that promote environmental stewardship.

Study findings suggest that the participants' environmental attitudes were indirectly and positively influenced by paternal educational attainment, that is, survey respondents whose fathers had higher levels of educational attainment had more positive environmental attitudes than their counterparts. This finding is consistent with those of Earle (1998), who found that parental attitudes may influence their children's attitudes toward natural resources. Although there are several possible explanations for this relationship (See Discussion, Mexicans), more research would help clarify the relationship between parental educational attainment and its influence on their children's environmental attitudes.

Looking at *environmental orientation*, Texas Latino college students who had not yet formed a definitive environmental orientation (responded "neutral" and "don't know") scored lower on the environmental concern scale than their counterparts who considered themselves "active," "sympathetic," or "unsympathetic. This suggests that individuals who have not yet formed a specific environmental orientation are less likely

to become engaged in environmental initiatives. This may also suggest that environmental apathy may be more prevalent in individuals without a polar (sympathetic or unsympathetic) environmental orientation. Environmental orientation apathy, for lack of a better term, has potential detrimental effects on natural resource initiatives along this border region. Further investigation into the relationship between environmental orientation apathy and support for environmental initiatives would help clarify this finding.

Finally, the results indicate that a *political candidate's stance on environmental issues* positively influenced Texas Latino college students' environmental attitudes. I hypothesize that Texas Latino college students surveyed and who were supportive of political candidates with a strong platform on environmental issues will likely be easier to engage. This information is useful to natural resource agencies who wish to engage this segment of the Latino community in program development and implementation because pro-environmental, politically conscious participants will be easier to engage in conservation management practices and policies.

Texas non-Latino Whites

My study findings suggest Texas non-Latino white environmental attitudes were influenced by the level of education their parents had achieved. Participants whose mother had obtained a higher education were more odds likely to have lower environmental attitudes. On the other hand, respondents whose fathers had achieved less than a high school diploma were more odds likely to have scored lower on the environmental concern scale than their counterparts. This finding is of interest because

it supports my hypothesis that the income derived from combined parental educational achievement falls within an environmental attitude-income continuum. In this continuum, the middle class bracket must be surpassed before there is an increase in environmental attitudes. So although my study found that non-Latino whites' mother's had a higher educational attainment, by itself, the income benefit derived from obtaining a higher level of education was not enough to surpass the environmental attitude-income continuum. Likewise, the income derived from a respondent's father's educational attainment was not enough, either by itself or collectively with the mother's income, to surpass the middle class bracket threshold where environmental attitudes begin to increase. My hypothesized environmental attitude-income continuum is further explained below.

In 2008, the median household income was $52, 175 (Mason and Sullivan, 2010). Mason and Sullivan write in Reuters United States Edition that economist J.D. Foster of the Heritage Foundation derived a middle class bracket by obtaining the middle 60% of income earned in the United States in 2008; the range provided is "roughly $25,000 to $100,000." I derived the hypothesized middle income bracket by comparing Foster's values with my study findings (respondent median income). Comparing my study's median income per population group [non-Latino white respondents ($75,000 to $109,999); Latino respondents ($25,000 to $49,999); and Mexican respondents ($9,999 and under)] with Foster's middle class bracket, the hypothesized middle class bracket that must be surpassed before there is an increase in respondent environmental attitudes, roughly falls between $10,000 and $109,000 for all three population groups. Participant

environmental attitudes were highest for those in the lower class bracket (below $10,000) and for those in the higher income bracket ($110,000). This finding adds some credence to my hypothesis of a middle class income bracket that must be surpassed on either side of the environmental attitude-income continuum and thus influence environmental attitudes; however, further research is necessary to test the validity of my hypothesis.

CONCLUSION

In summary, my study findings suggest that the environmental attitudes of three college and university student participant groups were influenced by both sociodemographic and sociopolitical variables. Participants (Mexicans, Texas Latinos, Texas non-Latino whites) in my study were from the US (Texas) and Mexico (Chihuahua, Tamaulipas, and Coahuila) along the critical Lower Rio Grande Valley, thus they represent an important emerging stakeholder for the future of natural resource conservation in this transborder region. Evidence from my study suggests that Mexican participants are more environmentally concerned than their U.S. participant counterparts. This finding is significant because it contradicts the common misperception that Mexicans do not care about the environment or environmental causes. Mexicans do care about the environment, and natural resource agencies should seize the opportunity to spread conservation strategies via information campaigns that target this and all stakeholders in this transborder region.

CHAPTER III

ENVIRONMENTAL BEHAVIORS AMONG THREE POPULATIONS ALONG U.S.–MEXICO BORDER

INTRODUCTION

The vitality of international transborder wildlife corridors is important for the preservation of migratory species along an expanse separated by political and cultural differences (Goodwin 2000, Fernandez and Carson 2002, Valdez et al. 2006, see Chapter II). This critical transborder region between the United States and Mexico (see Chapter II) is impacted by three major population groups: Mexicans, U.S. Latinos, and U.S. non-Latino whites. Like their U.S. Latino counterparts, Mexicans lag behind in educational attainment (Diaz Bautista 2003) and share similar geopolitical histories *vis* a *vis* Spanish conquest, defeat in war with U.S., and prevalence of poverty. Although Latinos on both sides of the border share many similarities, they differ in some very substantial characteristics. One important similarity is that very little is known about their environmental and natural resource conservation behaviors. Moreover, specific comparisons between the three major, border stakeholders (Mexicans, U.S. Latinos, and U.S. non-Latino whites) have not yet been made.

Natural resource managers continually face challenges in managing public natural resources, particularly with emerging stakeholders, oftentimes because very little information is available regarding their conservation attitudes, knowledge, and behaviors. A fundamental problem for natural resource agencies is recognizing and considering stakeholder interests in management and policy decision-making processes

(Bromley 1991, Decker et al. 2001). Ultimately, stakeholder perspectives and attitudes, which influence environmental behaviors, will affect the future of natural resource management (Susskind and Cruikshank 1987, Decker et al. 2001). Throughout history, organizations have used the connection between attitudes and behaviors to predict everything from voter outcomes to product success. In addition, marketing strategies make use of these relationships to devise and promote agendas and sales. One such assessment of public opinion conducted since the early 1970's is the General Social Survey, which considers sociodemographic, sociopolitical, and general attitude and behavior questions ranging from political affiliation to recreation behavior. The field of environmental psychology also uses this intricate connection between attitudes and general environmental behaviors. Research indicates that general environmental behaviors are influenced by several factors, among them parenting (Earle 1998, Grønhøj and Thøgersen 2009), sociodemographics (Klineberg et al. 1998), proximity to environmental events (Brody et al. 2004), and educational exposure (Bradley et al. 1997), among others. In the same vein, environmental attitude assessments are often utilized to help predict environmental behaviors, specifically proenvironmental behaviors (Nordlund and Garvill 2002), hence the emergence of environmental marketing. Thus, understanding differences in stakeholder attitudes, knowledge, and consequently stakeholder behavior, is needed for the overall success of management decisions made by wildlife, natural resource, and environmental agencies. Implementing public outreach programs, which foster partnerships between the agency and its constituents, requires an understanding of stakeholder attitudes and knowledge toward

natural resources and the environment. Partnerships formed from these outreach programs will enhance the management of natural resources and increase support for natural resource agencies and their missions (Harris 1985, Duda and Brown 1999, Decker et al. 2001).

Increasingly, Latinos, one of the fastest growing ethnic groups in the U.S., will be an important stakeholder target for these agency outreach programs (Lopez et al. 2005). The rapid growth of the Latino population in the United States (U.S.), specifically in the Southwest, has become increasingly important because of the influence Latinos will have on the future allocation and management of natural resources (Lopez et al. 2005). Yet research on Latino environmental and natural resource conservation attitudes and behaviors is very limited and fails to incorporate key cultural characteristics of the Latino population - cultural characteristics that may influence their behavior. Few studies have focused exclusively on determining Latino environmental and conservation behaviors in the United States (Mountjoy 1996); even less research has focused on Texas (Klineberg 1998). Participation in "Americanizing" systems (education, workforce participation, etc.) impacts Latinos' language, income, family values, and political activity (Burroughs and Reeff 1996, Marín and Gamba 1996, Schultz et al. 2000). Because research on this population is so limited, there is little empirical data regarding Latinos, their attitudes toward natural resources, wildlife, and the environment (See Chapter II), and their environmental and conservation behaviors. Nevertheless, extant research has found that higher educational attainment is associated with more environmentally friendly behaviors (Klineberg et al. 1998). Thus,

understanding knowledge and attitudes of educated Latinos toward natural resources will enhance the ability of agencies to engage these new stakeholders in conservation efforts (Lopez et al. 2005) and to possibly predict which issues are likely to garner more support from this subgroup. Thus, the objectives of my study were (1) to determine environmental behaviors along the U.S.–Mexico border region by surveying community college and university students who are Mexican, U.S. Latino, and U.S. non-Latino white and (2) to examine the role sociodemographic and sociopolitical variables play on environmental knowledge, attitudes, and behavior among college students in this transborder region.

STUDY AREA

Mexico Study Area

I surveyed Mexican community college and university students from eight academic institutions: Tecnológico de Monterrey, Campus Ciudad Juarez (Ciudad Juarez, Chihuahua); Universidad Autónoma de Coahuila, Unidad Norte (Piedras Negras, Coahuila); Universidad Autónoma del Noreste (Piedras Negras, Coahuila); Universidad Autónoma de Piedras Negras (Piedras Negras, Coahuila); Universidad Autónoma de Tamaulipas, Unidad Reynosa (Reynosa, Tamaulipas); Universidad Mexico Americana del Norte, A.C., (Ciudad Reynosa, Tamaulipas); Universidad Pedagógica Nacional (Piedras Negras, Coahuila); Universidad Valle del Bravo, Campus Nuevo Laredo (Nuevo Laredo, Tamaulipas). I was interested in sampling only college students because I wanted to control for education as an independent variable. I selected these community colleges and universities based on their location near and along the U.S.–Mexico border.

Thus, my study sample was a purposive sample (Babbie 1990) because it focused exclusively on identifying the natural resource and environmental attitudes of educated Mexicans who lived near or along the United States–Mexico border.

United States Study Area

I surveyed Texas Latino community college and university students from seven academic institutions: Coastal Bend Community College (Alice, TX); Coastal Bend Community College (Beeville, TX); Coastal Bend Community College (Kingsville, TX); El Centro Community College (Dallas, TX); El Paso Community College (El Paso, TX); and University of Texas at Brownsville (Brownsville, TX). Like with the Mexican sample, I was interested in sampling only college students to control for education as an independent variable. I selected these community colleges and universities because they were located in highly Latino-populated areas (Hispanic Serving Institutions, >50% of students Latinos). Thus, my study sample was a purposive sample (Babbie 1990) because it focused exclusively on identifying the natural resource and environmental attitudes of educated Texas Latinos of Mexican descent.

METHODS

Survey Development

I derived an index of environmental behavior consisting of questions from three commonly used indices of environmental concern and behavior: General Social Survey (2003), New Ecological Paradigm (NEP; Dunlap et al. 2000), and the Texas Biennial Environmental Survey (TBES; Klineberg 1998). For the purposes of this chapter, I will focus on my findings from the TBES (Klineberg 1998) portion of my survey. I selected

13 questions from the TBES to determine environmental behaviors (Table 3.1). Responses for the TBES questions were in several formats: Likert format (1–5 with 1 = Always, 2 =Often, 3 = Sometimes, 4 = Never, and 5 = Not Available); yes/no (1 = yes, 2 = no); multiple choice (1 = Gas station, service center, etc., 2 = In yard, trash, etc., 3 = Other; and 1 = Once every 3 months, 2= Once or twice in year, 0 = Not at all in past year); and please specify, formats (Table 3.1).

I divided the variables included in my survey instruments into two categories: sociodemographic and sociopolitical. Several sociodemographic (ethnicity, religious preference, religious participation, etc.) and sociopolitical (political party affiliation, political participation, etc.) questions were deemed either out of context due to linguistic and cultural differences or were considered discriminatory for Mexican populations and were omitted from my Mexican survey. Questions omitted in the Mexican population were not used in any of the analysis in this chapter. Sociodemographic variables included (1) ethnicity (Latino, non-Latino; used only with the Texas population), (2) sex (M, F), (3) age (≤20 yr, 21-30 yr, 31-40 yr, 41-50 yr, ≥51 yr), (4) combined parent income (≤$9,999, $10,000-24,999, $25,000-49,999, $50,000-74,999, $75,000-109,999, ≥$110,000; an equivalent scale was used in Mexican currency based on the current market currency rate, $10 Mexican pesos to $1 United States Dollar, 2006), (5) father's

Table 3.1. Texas Biennial Environmental Survey questions used in determining Latino environmental behaviors among Texas, USA, and Mexico students[a b c d e], (*n* = 995), 2010.

Questions	
During the past year, how often have you or other household members participated in any of the following activities? 1. Saved glass, plastic, cans, bottles, or newspapers for recycling. [a] 2. Contributed time or money to an environmental or conservation group. [a] 3. Participated in a specific environmental project in your community, such as picking up litter or planting trees. [a] 4. Specifically avoided buying or using environmentally damaging products, such as non-bio-degradable plastics or high-phosphate detergents. [a] 5. Are you a member of any group whose main aim is to preserve or protect the environment? [b]	6. In the last five years, have you signed a petition about an environmental issue? [b] 7. In the last five years, have you taken part in a protest or demonstration about an environmental issue? [b] 8. Does your neighborhood have curbside recycling? [b] 9. Is there a "household hazardous waste disposal site" in your area? [b] 10. During past year, have you personally changed the oil in a car or truck? [b] 11. If Yes, how did you dispose of the used oil? [cd] 12. Do you have a lawn or yard for which you are responsible? [b] 13. If Yes, during past year, how many times did you use fertilizers on the lawn? [e]

[a] 0 = Not Available, 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always
[b] 1 = No, 2 = Yes
[c] 1 = Gas station, service center, etc., 2 = In yard, trash, etc., 3 = Other. Please specify.
[d] Specify other disposal method.
[e] 1 = Once every 3 months, 2= Once or twice in year, 0 = Not at all in past year

education level (less than a high school diploma, high school diploma, technical school and/or some college, college degree, and graduate degree), (6) mother's education level (scale identical to father's education), and (7) place of origin (Texas Latino, Texas non-Latino white, and Mexican).

Sociopolitical variables included (1) environmental orientation (active environmentalist, sympathetic, neutral, unsympathetic, don't know), and (2) political candidate's position on environmental issues (very important, somewhat important, not very important). The survey instrument was translated into Spanish and provided to the university professors and graduate students in Mexico, who reviewed and edited the survey. This procedural step was part of a collaborative grant project between US and Mexican universities. Texas A&M University's Institutional Review Board (protocol No. 2005-021) approved study protocols.

Data Collection

In Spring 2005, I compiled e-mail addresses for all faculty at targeted (proximity to border and/or Hispanic serving) academic institutions in Texas. I sent an email message, requesting assistance in conducting my survey during regularly scheduled class times, to all faculty members. Faculty members that responded to the initial e-mail contact and that agreed to participate chose to administer the surveys themselves. I sent each faculty member instructions on how to conduct the survey and an informed consent form for each student participant, along with the appropriate number of surveys, and a prepaid return envelope. Following provided survey protocol, professors and graduate students distributed and collected surveys from various universities along the U.S. –

Mexico border. In Fall 2006, I collaborated on a project grant and worked with Texas and Mexico university professors and graduate students.

Data Analysis

For the Texas population, I selected surveys where respondents identified themselves as Latino for the Latino population and as non-Latino white for the non-Latino white population. I used the selected surveys for further analyses. For the Mexico population, I included all surveys since distinctions based on ethnicity are not valid and considered discriminatory. I compared the level of participation in environmental behavior (based on participant responses to 13 environmental behavior questions) among the three populations, to nine sociodemographic variables using ordinal, binary, and multinomial logistical regression in SPSS. I calculated odds ratios for significant ($P < 0.05$) model variables (Hosmer and Lemeshow 2000). The odds ratio is one set of odds divided by another. For example, an odds ratio of 2.5 for men (gender is the predictor) in having a heart attack (response variable) is 2.5 times greater when compared to women (Hosmer and Lemeshow 2000). In other words, the odds ratio compares one unit of change in one predictor relative to another.

RESULTS

Surveys Collected

For the Texas population, I mailed surveys (n = 1,353) to 27 Texas community college and university professors who were willing to participate in the study. Of these, seven professors did not return surveys and 20 professors returned completed surveys (n = 755, final response rate 56%). Of the 755 surveys received, 16% (n = 120) were from

non-Latino participants. This non-Latino group was further divided into two groups: non-Latino white (*n* = 75) and other (*n* = 45). The sociodemographic profile for the non-Latino white participants was the following: age (mean = 27.86 yr, SD = 9.69), gender (69%F), classification (30% freshman, 35% sophomore, 15% junior, 15% senior, 5% other), and combined parental income (median = $75,000-109,000 USD, *n* = 48). The remaining surveys (84%, *n* = 635) were from Latino participants whose sociodemographic profile was the following: age (mean = 25.21 yr, SD = 7.90), gender (69%F), classification (25% freshman, 39% sophomore, 21% junior, 12% senior, 3% other), and combined parental income (median = $25,000-49,999 USD, *n* = 420).

For the Mexican population, (*n* = 284), eight universities were randomly selected from among all universities near or on the Mexico–Texas, United States border region. Because Mexican universities vary in their organizational, administrative and procedural structure, Mexico university professors and graduate students obtained 100% participant compliance from the selected groups. The sociodemographic profile for the Mexican participants was the following: age (mean = 21.88 yr, SD = 4.39), gender (55%F), classification (21% freshman, 32% sophomore, 22% junior, 19% senior, 6% other), and combined parental income (median = $9,999 USD and under, *n* = 247).

Predictors of Environmental Behavior

Combined Population.—When all three populations were combined, a total of seven independent variables were important in predicting four environmental behaviors: (1) Environmental Conservation Contribution [*environmental orientation* (Active, *P* = 0.008; Table 3.2, Figure 3.1) and *political candidate's environmental position* (Very

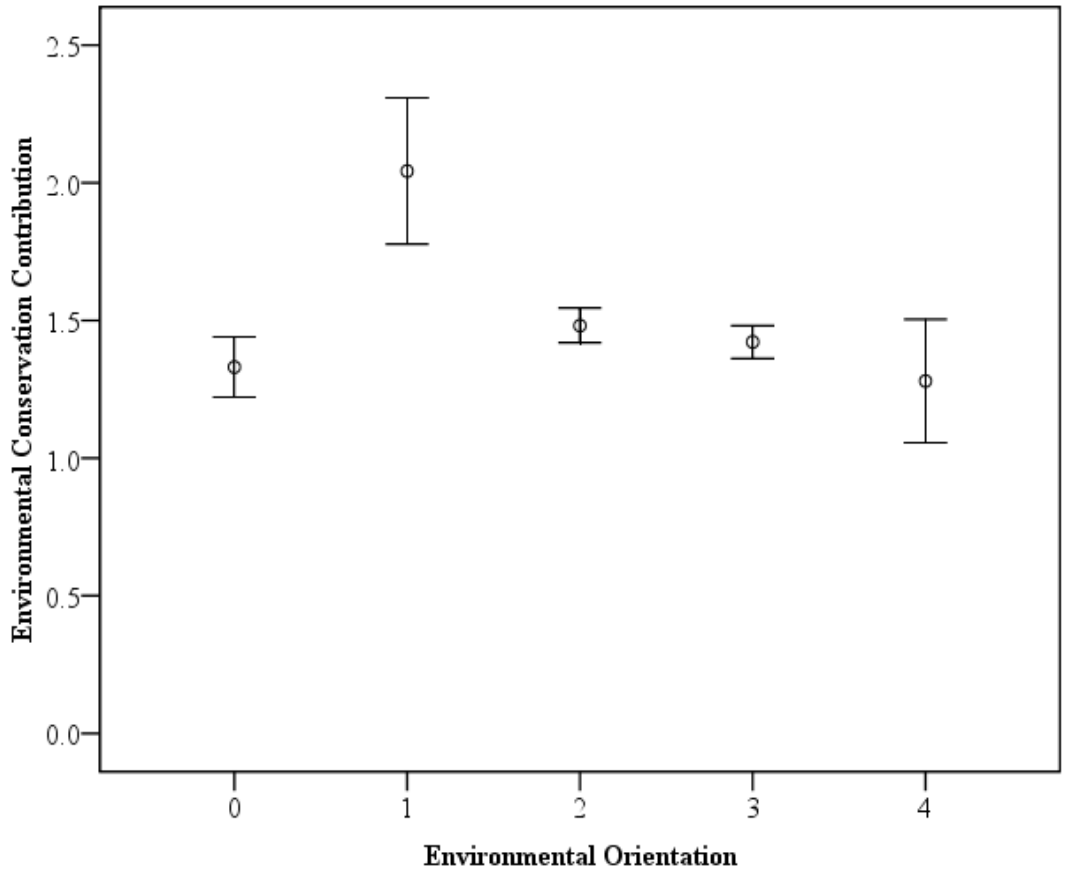
Important, $P = 0.012$; Table 3.2, Figure 3.2)]; (2) Avoided Environmentally Harmful Products [*environmental orientation* (Active, $P = 0.009$; Table 3.2, Figure 3.3); *political candidate's environmental position* (Very Important, $P < 0.001$, and Somewhat Important, $P < 0.001$; Table 3.2, Figure 3.4); *father's educational attainment* (High School Diploma, $P = 0.038$, Technical School and/or Some College, $P = 0.011$, and College Degree, $P = 0.014$; Table 3.2, Figure 3.5); and *place of origin* (Mexicans, $P = 0.003$; Table 3.2, Figure 3.6)]; (3) Changed Oil [*sex* (Male, $P = 0.001$; Table 3.2, Figure 3.7); and *mother's educational attainment* (College Degree, $P = 0.028$; Table 3.2, Figure 3.8)]; and (4) Lawn Responsibility [*sex* (Male, $P = 0.015$; Table 3.2, Figure 3.9); and *parent income* ($10,000-24,999, $P = 0.031$, and $50,000-74,999, $P = 0.003$; Table 3.2, Figures 3.10)].

Environmental Conservation Contribution.—Regarding making environmental conservation contributions, participants from all three population groups who identified their *environmental orientation* as "active" environmentalists were more odds likely (≈ 2.565 odds) to make environmental conservation contributions than participants who identified themselves as being "unsympathetic" towards environmental causes (Table 3.2, Figure 3.1). Participants for whom a *political candidate's environmental position* was "very important" were more odds likely (≈ 1.438 odds) to make environmental conservation contributions than participants who felt a political candidate's environmental position was "not at all important" (Table 3.2, Figure 3.2).

Table 3.2. Model parameter estimates for significant ($P < 0.05$) variables predicting environmental conservation contribution in the combined population, 2010.

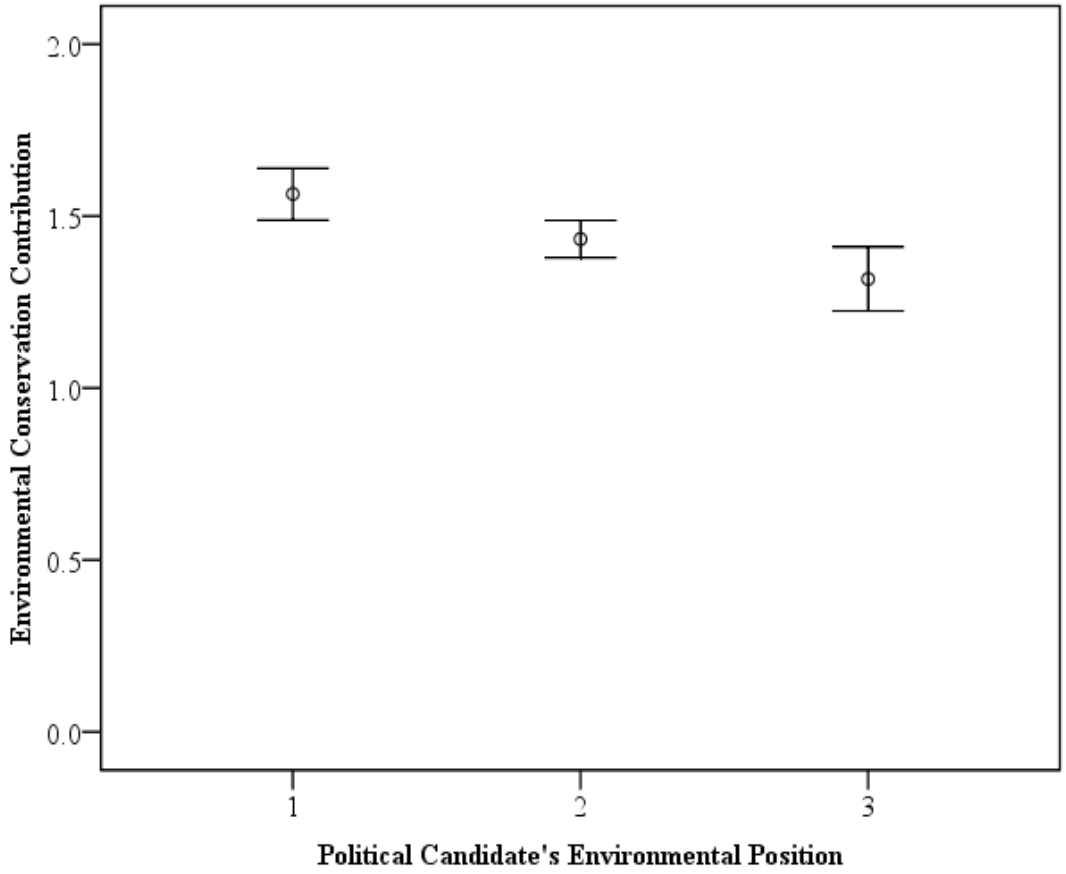
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Environmental Orientation					
Don't Know	0.137	0.661	1.147	-0.475	0.750
Active	0.942	0.008*	2.565	0.249	1.635
Sympathetic	0.247	0.390	1.280	-0.316	0.810
Neutral	0.115	0.688	1.122	-0.446	0.676
Unsympathetic	0	-	-	-	-
Political Candidate's Environmental Position					
Very Important	0.363	0.012*	1.438	0.080	0.645
Somewhat Important	0.233	0.075	1.262	-0.024	0.491
Not Very Important	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



0=Don't Know, 1=Active, 2=Sympathetic, 3=Neutral, 4=Unsympathetic

Figure 3.1. Environmental Conservation Contribution mean score for combined population by environmental orientation, 2010.



1=Very Important, 2=Somewhat Important, 3=Not at all Important.

Figure 3.2. Environmental Conservation Contribution mean score for combined population by political candidate's environmental position, 2010.

Avoided Environmentally Harmful Products.—When participants were asked about their avoiding environmentally harmful products, participants from all population groups who identified their *environmental orientation* as "active" environmentalists were more odds likely (≈ 2.532 odds) to avoid environmentally harmful products when compared to participants who were "unsympathetic" in their environmental orientation; however, those who "d[id]n't know" their specific environmental orientation were slightly more odds likely to avoid environmentally harmful products versus those who were "not at all sympathetic" in their environmental orientation (≈ 1.390 odds and ≈ 1.719 odds, respectively; Table 3.3, Figure 3.3).

Participants who felt that a *political candidate's environmental position* was "very important" and "somewhat important" were more odds likely (≈ 1.772 odds and ≈ 1.508 odds, respectively) to avoid environmentally harmful products when compared to others who felt that a political candidate's environmental position was "not at all important" (Table 3.3, Figure 3.4).

Students whose *father's educational attainment* was either a "high school diploma, attended technical school and/or some college," or obtained a "college degree" were less odds likely (≈ 1.477 odds, ≈ 1.300 odds, and ≈ 1.068 odds, respectively; Table

3.3, Figure 3.5) to avoid environmentally harmful products than their counterparts whose father had obtained a “graduate or professional degree”. Participants whose father had obtained a “college degree” were more odds likely to avoid environmentally harmful products than those whose father had obtained less than a college degree. Students whose father had attended “technical school and/or some college” were more odds likely to avoid environmentally harmful products when compared to those whose father had obtained a “high school diploma”; conversely, participants whose father had not obtained a high school diploma were slightly more odds likely (≈ 1.511 odds) to avoid environmentally harmful products when compared to students whose father had attended “technical school and/or some college” and were almost equally likely to avoid environmentally harmful products as those whose fathers had attended technical school and/or some college.

When *place of origin* was examined, Mexican participants were more odds likely (≈ 1.900 odds) to avoid environmentally harmful products (Table 3.3, Figure 3.6) than their Texas counterparts.

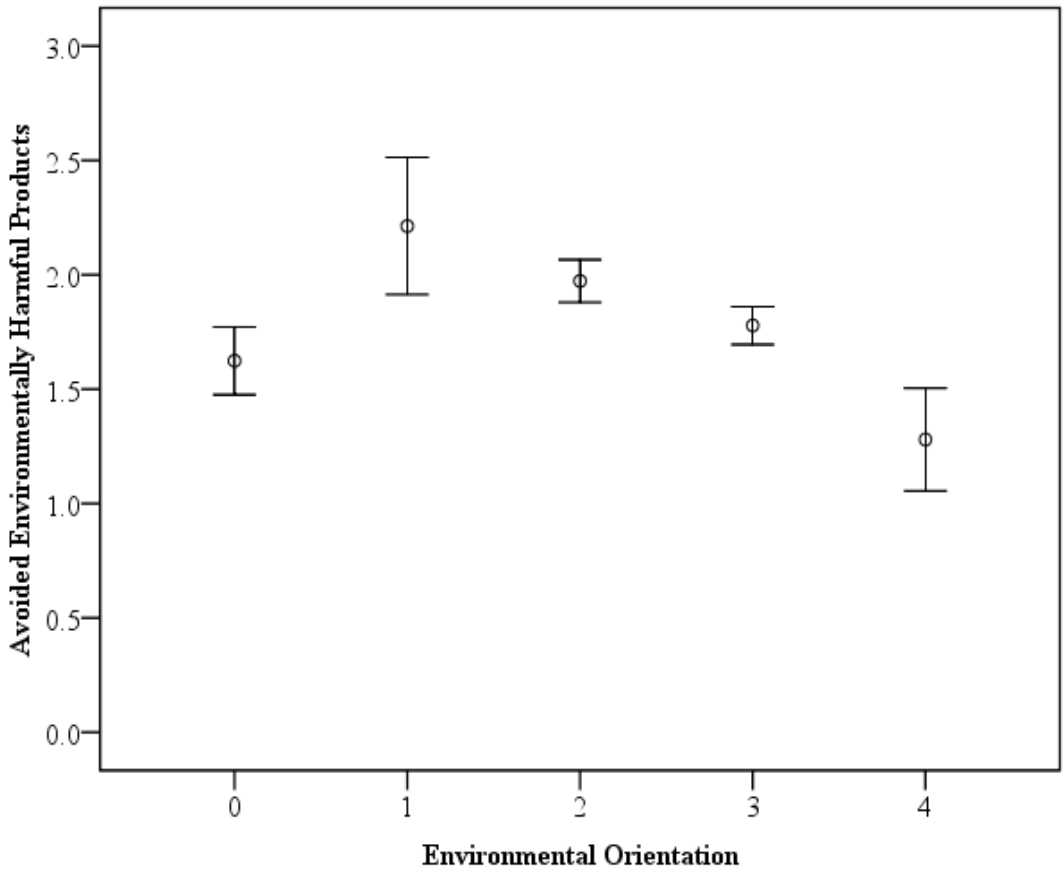
Table 3.3. Model parameter estimates for significant ($P < 0.05$) variables predicting avoidance of environmentally harmful products in the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Environmental Orientation					
Don't Know	0.329	0.285	1.390	-0.274	0.931
Active	0.929	0.009*	2.532	0.236	1.622
Sympathetic	0.558	0.050	1.747	8.480E-5	1.116
Neutral	0.542	0.056	1.719	-0.014	1.098
Unsympathetic	0	-	-	-	-
Political Candidate's Environmental Position					
Very Important	0.572	0.000*	1.772	0.296	0.848
Somewhat Important	0.411	0.001*	1.508	0.162	0.661
Not Very Important	0	-	-	-	-
Father's Educational Attainment					
Less than a High School Diploma	-0.413	0.076	1.511	-0.767	-0.059
High School Diploma	-0.390	0.038*	1.477	-0.780	0.001
Technical School and/or Some College	-0.260	0.011*	1.300	-0.622	0.101
College Degree	-0.066	0.014*	1.068	-0.447	0.315
Graduate Degree	0	-	-	-	-

Table 3.3. Continued.

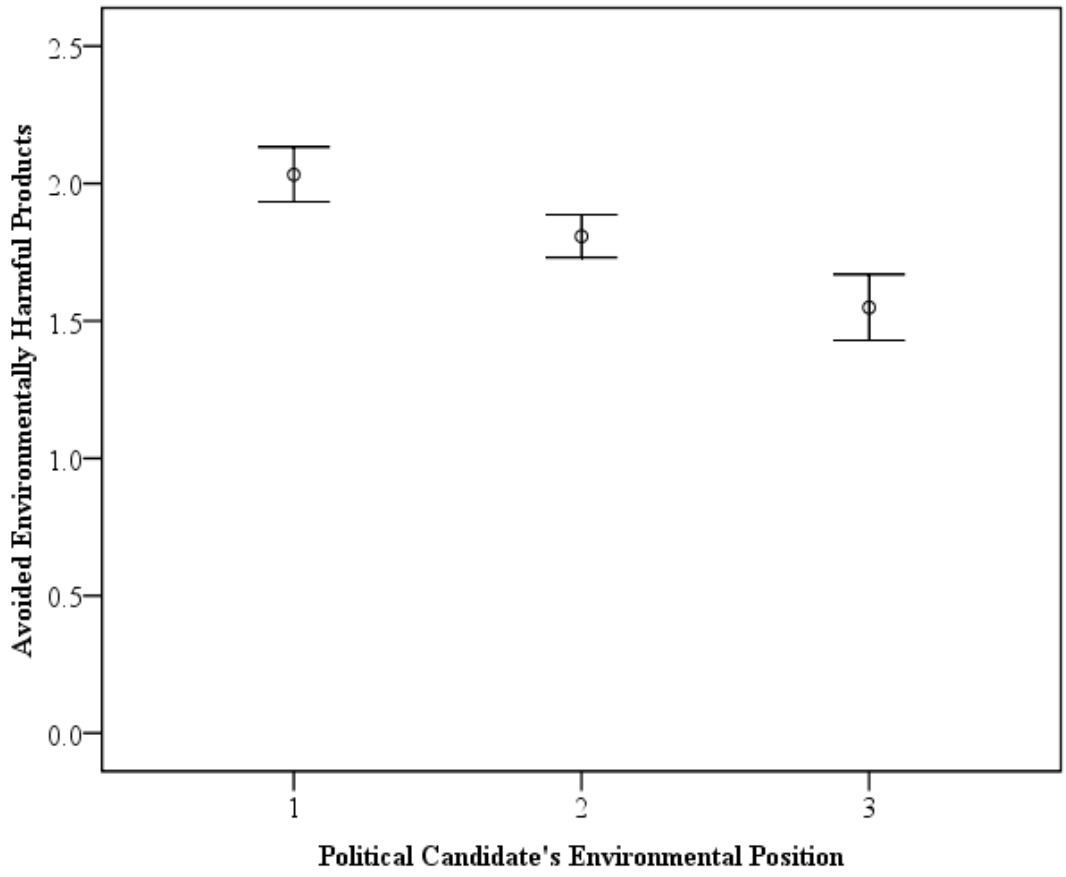
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexicans	0.642	0.003*	1.900	0.220	1.063
Texas Latinos	0.336	0.068	1.400	-0.025	0.696
Texas Non-Latino White	0	-	-	-	-

*Significant at $P<0.05$ for comparisons among model variables.



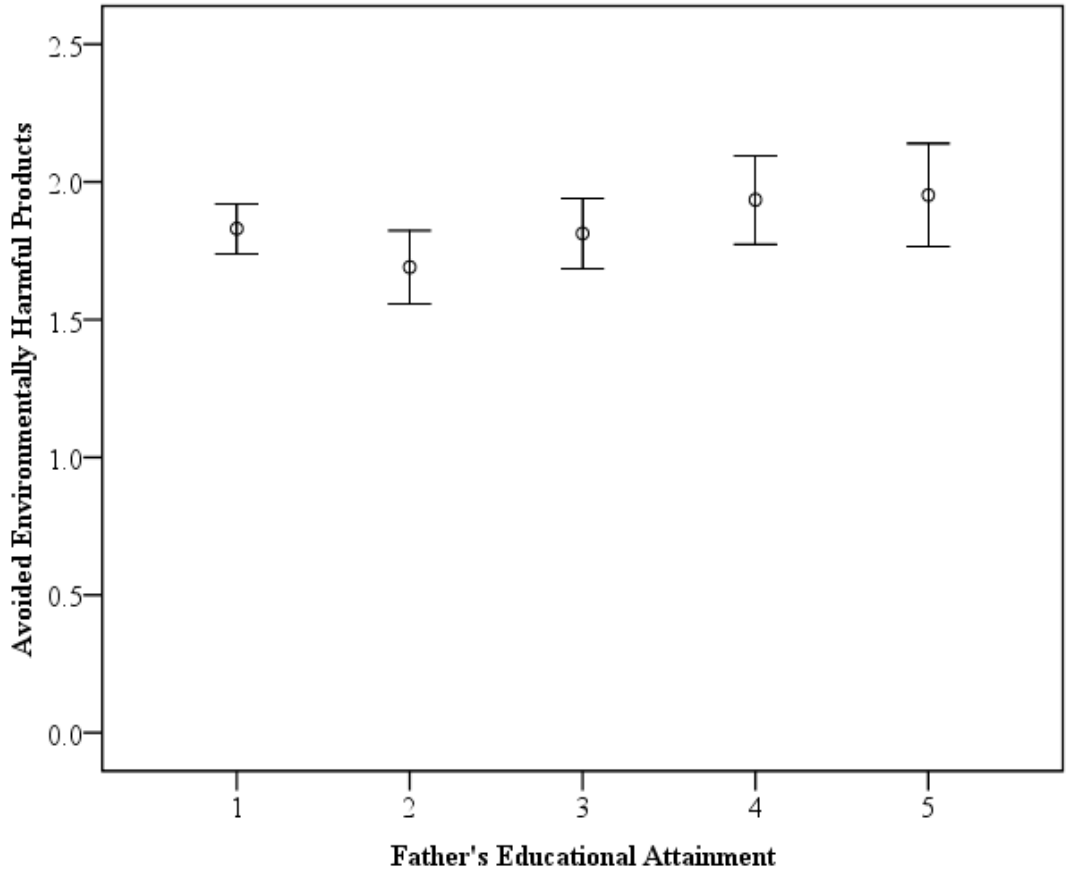
0=Don't Know, 1=Active, 2=Sympathetic, 3=Neutral, 4=Unsympathetic

Figure 3.3. Avoided Environmentally Harmful Products mean score for combined population by environmental orientation, 2010.



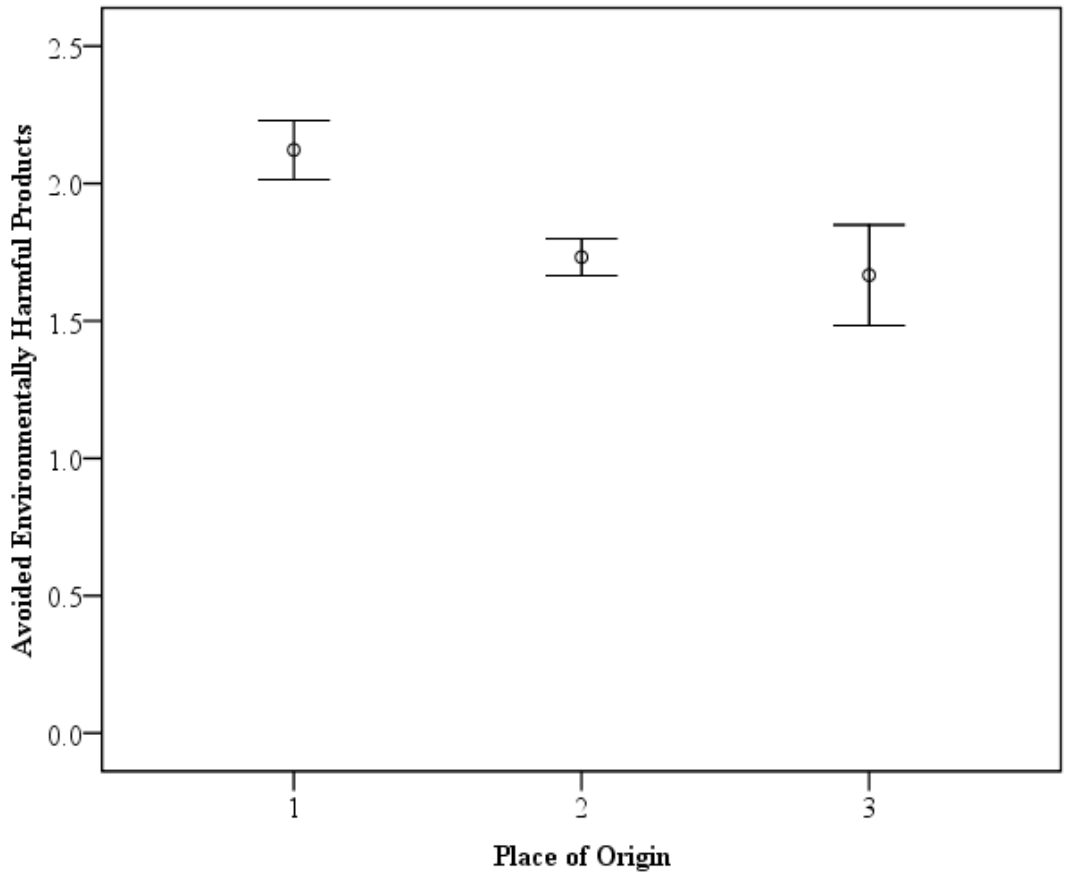
1=Very Important, 2=Somewhat Important, 3=Not at all Important.

Figure 3.4. Avoided Environmentally Harmful Products mean score for combined population by political candidate's environmental position, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate Degree

Figure 3.5. Avoided Environmentally Harmful Products mean score for combined population by father's educational attainment, 2010.



1=Mexicans, 2=Texas Latinos, 3=Texas Non-Latino Whites

Figure 3.6. Avoided Environmentally Harmful Products mean score for combined population by place of origin, 2010.

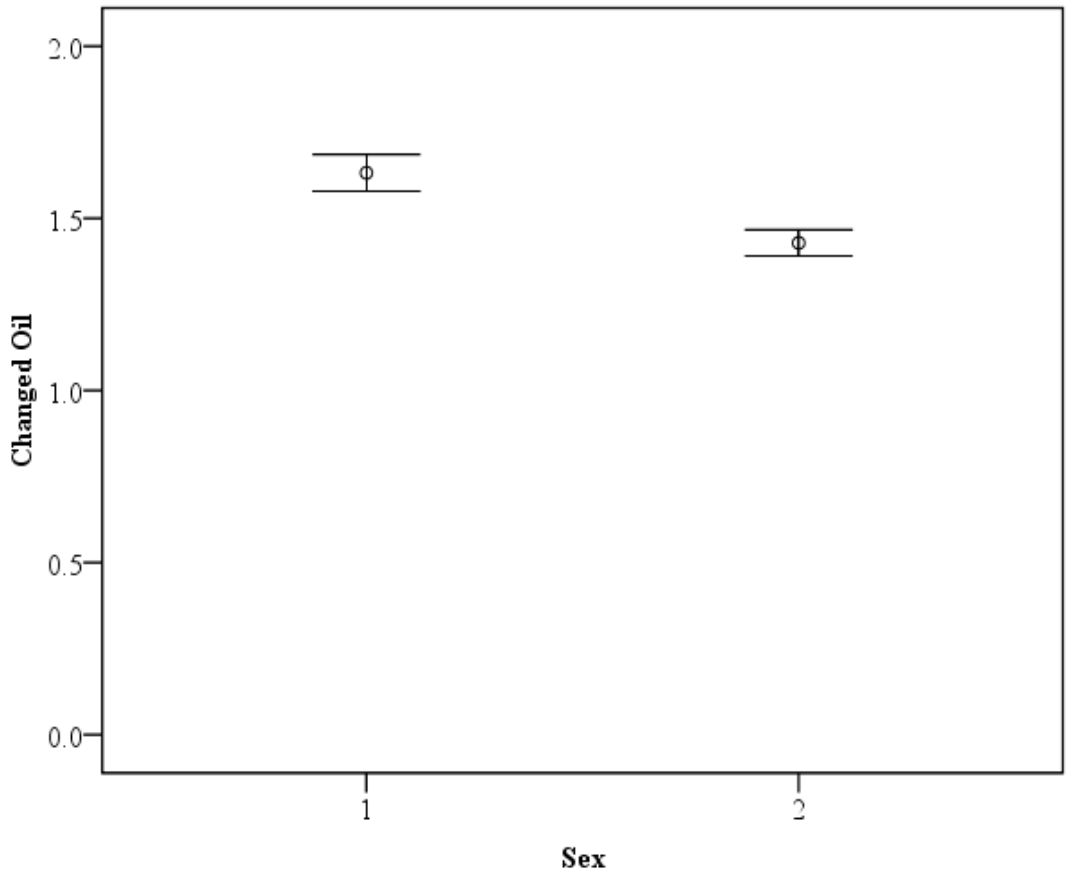
Changing Oil.—When asked about their oil changing behavior, *sex* and *mother's educational attainment* were influencing factors for all three populations. *Sex* was a variable that influenced changing oil behavior; males were more odds likely (≈ 2.371 odds) to change the oil in their car versus females (Table 3.4, Figure 3.7).

Participants whose *mother's educational attainment* was a college degree were more odds likely (≈ 2.443 odds) to personally change the oil in a vehicle compared to participants whose mother had obtained a graduate degree (Table 3.4, Figure 3.8). Furthermore, when considering only male participant data from all population groups, 132 respondents disposed of oil in a designated disposal site (mother's educational attainment: 41 less than high school diploma, 24 high school diploma, 29 technical school or some college, 21 college degree, and 17 graduate or professional degree), 8 respondents disposed of their oil at a recycling center (mother's educational attainment: 1 less than high school diploma, 2 high school diploma, 2 technical school or some college, 2 college degree, and 1 graduate or professional degree), 8 respondents decided to conserve and reuse their oil (mother's educational attainment: 6 less than high school diploma and 2 graduate or professional degree), 7 respondents disposed of the oil on land (mother's educational attainment: 1 less than high school diploma, 1 high school diploma, 3 technical school or some college, 1 college degree, and 1 graduate or professional degree), and 36 respondents chose to dispose of their oil in the yard or trash (mother's educational attainment: 15 less than high school diploma, 5 high school diploma, 9 technical school or some college, 6 college degree, and 1 graduate or professional degree).

Table 3.4. Model parameter estimates for significant ($P < 0.05$) variables predicting oil changing behavior in the combined population, 2010.

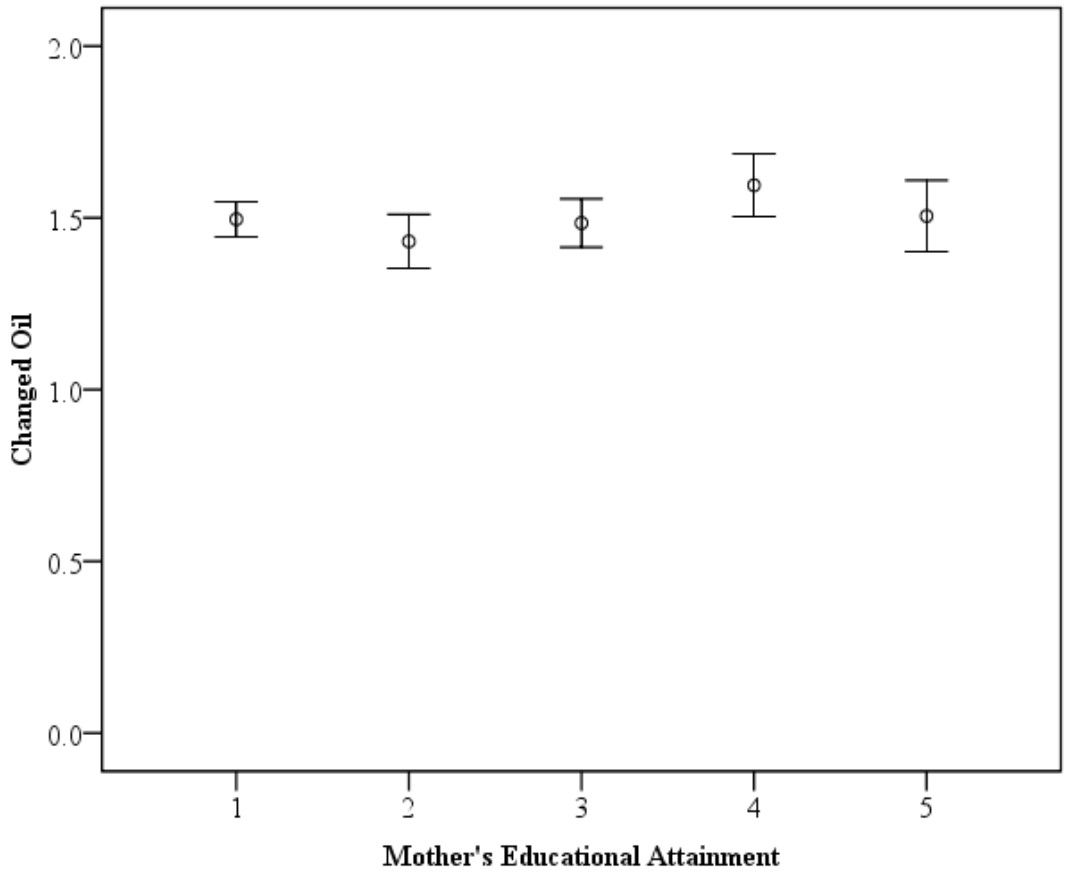
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Sex					
Male	0.863	0.001*	2.371	1.633	3.443
Female	0	-	-	-	-
Mother's Educational Attainment					
Less than a High School Diploma	0.316	0.386	1.372	0.671	2.804
High School Diploma	0.163	0.673	1.177	0.551	2.514
Technical School and/or Some College	0.287	0.433	1.333	0.650	2.730
College Degree	0.893	0.028*	2.443	1.102	5.416
Graduate Degree	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Male, 2=Female

Figure 3.7. Changed Oil mean score for combined population by sex, 2010.



1=Less than a High School Diploma, 2=High School Diploma, 3=Technical School and/or Some College, 4=College Degree, 5=Graduate Degree

Figure 3.8. Changed Oil mean score for combined population by mother's educational attainment, 2010.

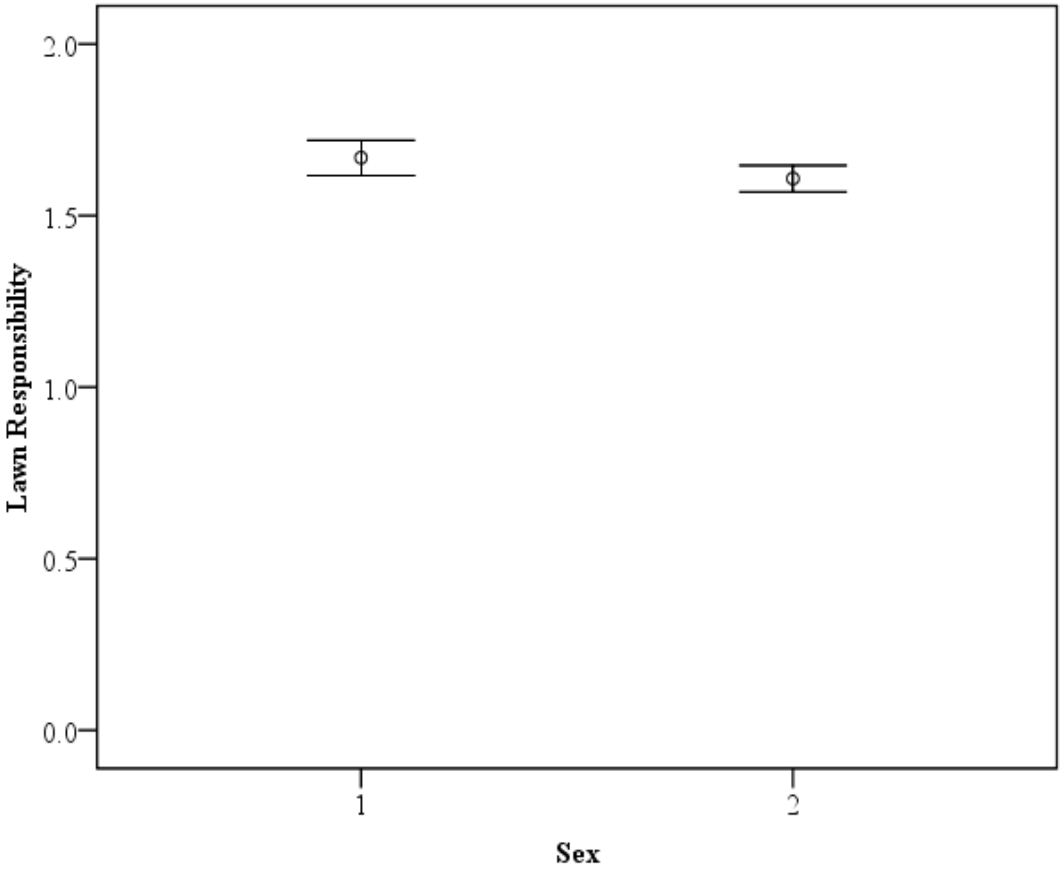
Lawn Responsibility.—The analysis indicates that when it came to lawn care, *sex* and *combined parent income* were found to influence lawn responsibility behaviors. Results, in Table 3.5 indicate that male participants from the combined population were more odds likely (≈ 1.655 odds) to be responsible for a lawn versus female participants (Figure 3.9).

Participants whose *parents' combined income* was between "$10,000-24,999" and "$50,000-74, 999" were more odds likely (≈ 3.171 odds and 5.919 odds, respectively) to be responsible for a lawn than their counterparts (Table 3.5, Figure 3.10) who stated they "did not know" their parent's combined annual income. Specifically, when considering only male participants from the combined population, who were responsible for lawn care, 71 respondents did not fertilize their lawn in the past year, 63 respondents fertilized their lawn once or twice in the past year, and 19 respondents fertilized their lawn at least once every 3 months.

Table 3.5. Model parameter estimates for significant ($P < 0.05$) variables predicting lawn responsibility behavior in the combined population, 2010.

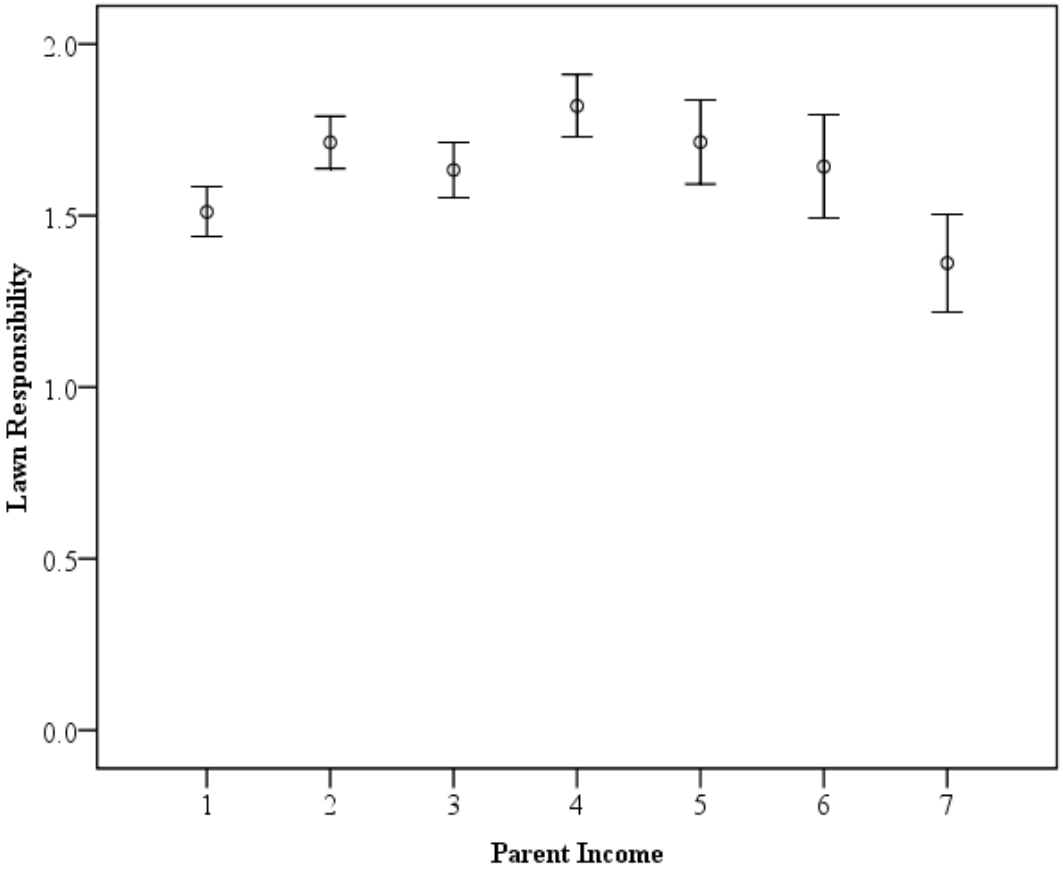
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Sex					
Male	0.504	0.015*	1.655	1.105	2.479
Female	0	-	-	-	-
Parent Income (U.S. Dollars)					
9,999 and under	0.306	0.516	1.358	0.539	3.418
10,000-24,999	1.154	0.031*	3.171	1.115	9.021
25,000-49,999	.806	0.127	2.238	0.795	6.300
50,000-74,999	1.778	0.003*	5.919	1.832	19.119
75,000-109,999	1.067	0.076	2.906	0.895	9.437
110,000 and over	0.689	0.252	1.992	0.612	6.479
Don't Know	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Male, 2=Female

Figure 3.9. Lawn Responsibility mean score for combined population by sex, 2010.



1=$9,999 and under, 2=$10,000-24,999, 3=$25,000-49,999, 4=$50,000-74,999, 5=$75,000-109,999, 6=$110,000 and over, 7=I don't know

Figure 3.10. Lawn Responsibility mean score for combined population by parent income, 2010.

Mexicans.—For my student sample, only one independent variable (not including place of origin), *parent income*, was important in predicting environmental behaviors: lawn responsibility [*parent income* ($10,000-24,999, $P = 0.016$; Table 3.6, Figure 3.11)]. Mexican participants whose *parent income* was between "$10,000-24, 999" were more odds likely (≈ 12.160 odds) to be responsible for a lawn when compared to other Mexican participants who indicated they did not know their parent's combined annual income (Table 3.6, Figure 3.11). The total number of participants, who said they were responsible for lawn maintenance, was 121, of which 52 respondents indicated they had not fertilized their lawn in the past year, 53 respondents indicated they had fertilized their lawn between one to two times in the past year, and 16 respondents indicated they had fertilized their lawn every 3 months in the past year.

Texas Latinos.—Of the eight independent variables tested (not including place of origin) for predicting environmental behavior scores, only one, sex, was important in predicting Lawn Responsibility [*sex* (Male, $P = 0.037$; Table 3.7, Figure 3.12)] among my sample of Texas Latino students.

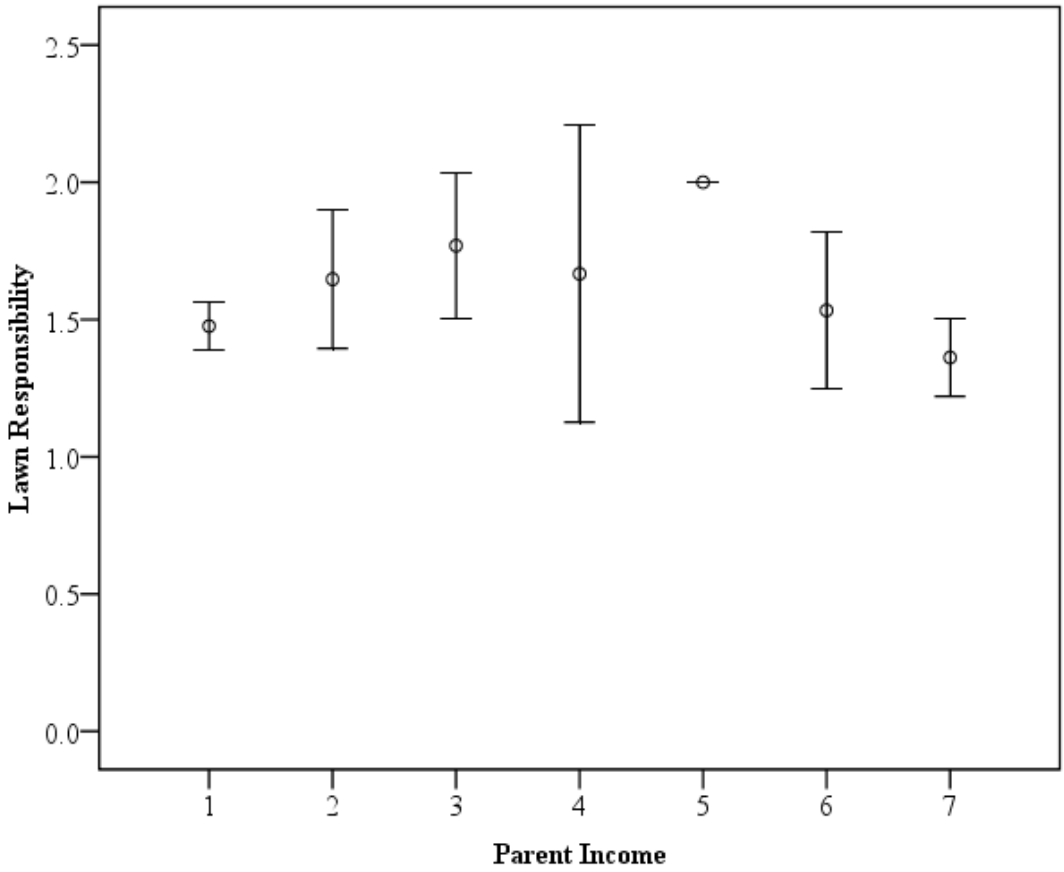
Lawn Responsibility.—For the Texas Latino population, *sex* was the independent

Table 3.6.

Model parameter estimates for significant ($P < 0.05$) variables predicting lawn responsibility behavior by Mexican population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Parent Income (U.S. Dollars)					
9,999 and under	0.411	0.452	1.508	0.517	4.399
10,000-24,999	2.498	0.016*	12.160	1.589	93.050
25,000-49,999	2.193	0.091	8.966	0.707	113.761
50,000-74,999	2.035	0.167	7.655	0.428	137.026
75,000-109,999	21.972	0.999	3.487E9	0.000	-
110,000 and over	-0.339	0.690	0.713	0.135	3.768
Don't Know	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=$9,999 and under, 2=$10,000-24,999, 3=$25,000-49,999, 4=$50,000-74,999, 5=$75,000-109,999, 6=$110,000 and over, 7=I don't know

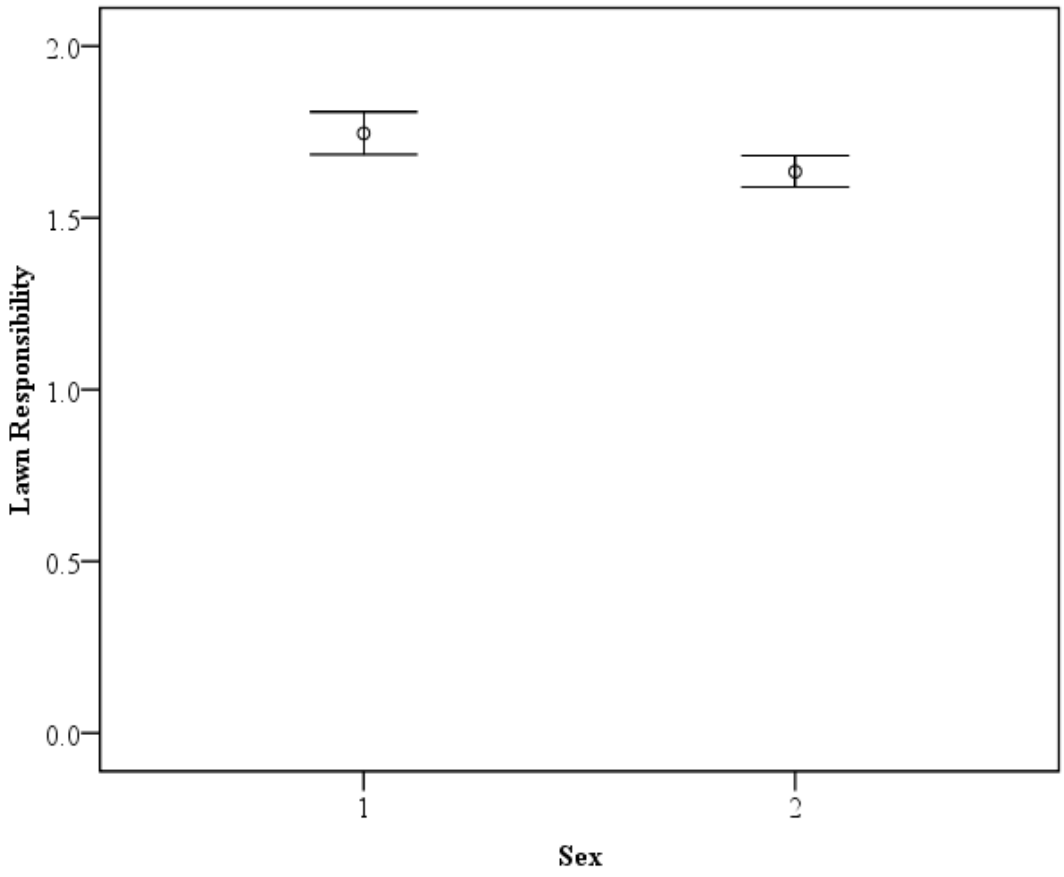
Figure 3.11. Lawn Responsibility mean score for Mexicans by parent income, 2010.

variable that influenced lawn responsibility behavior. Male participants were more odds likely to be responsible for lawn care (≈ 1.825 odds) when compared to Texas Latino female participants (Table 3.7, Figure 3.12). Specifically, 79 male respondents did not fertilize their lawn in the past year, 50 respondents fertilized their lawn only once or twice in the past year, and 17 respondents fertilized their lawn every 3 months.

Table 3.7. Model parameter estimates for significant ($P < 0.05$) variables predicting lawn responsibility behavior by Texas Latino population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Sex					
Male	0.601	0.037*	1.825	1.037	3.212
Female	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Male, 2=Female

Figure 3.12. Lawn Responsibility mean score for Texas Latinos by sex, 2010.

Texas non-Latino Whites.—Of the eight independent variables tested (not including place of origin as a variable) for predicting environmental behavior scores, none were important in predicting environmental concern among my sample of Texas non-Latino white students.

DISCUSSION

Combined Population

When I combined all three population groups (Mexican, Texas Latino, and Texas non-Latino white college students), environmental behaviors which involved having to pay money for a service or good (avoiding environmentally harmful products, changing oil, and lawn responsibility), as opposed to making a donation of time or money, were more associated with sociodemographic variables (*sex* and *place of origin*), some of which may be derived from parental socioeconomic position, such as parent's educational attainment and parent income. Environmental behaviors that involved community college or university students donating time or money to a cause, such as environmental conservation contributions where exchanges of tangible goods (products or services) are nonexistent, were more associated with sociopolitical variables (*environmental orientation* and *political candidate's environmental position*).

The behavior of community college and university students in my sample supports theories discussed by Nordlund and Garvill (2002). According to these authors, "personal norm[s] … mediate the effects of values and problem awareness on proenvironmental behavior (743)." They provide an elaborate explanation of Schwartz's norm-activation theory and Schwartz's Value Inventory Scale (1977; 743) and consider

one of it's "dimensions: self-transcendence [value types universalism and benevolence] versus self-enhancement [power and achievement] (744)." The authors further incorporate Thompson and Barton's (1994) motives "scale assessing anthropocentric and ecocentric motives [human centered and utilitarian versus sacrificial, respectively] for proenvironmental behavior (744)." According to Nordlund and Gavin (2002), studies by Thompson and Barton (1994) found that ecocentric motives were positively related to proenvironmental behaviors, more so than anthropocentric motives (744).

Expounding on Nordlund and Gavin's (2002) ideas, college and university students, whose actions (fertilize lawn, change oil, and avoid environmentally harmful products) were influenced by sociodemographic variables (*sex* and *place of origin*), can be said to have anthropocentric motives (utilitarian), because it can be said that these individuals somehow benefitted from their actions (i.e., lawn care, with or without the use of fertilizers, benefits the owner of the lawn, both directly and indirectly, as does changing the oil in a vehicle).

Students, who were moved by sociopolitical variables (*environmental orientation* and *political candidate's environmental position*) to engage in environmental conservation contributions, can be said to have had ecocentric motives because they did not directly benefit from their actions (i.e., contributed time or money for an environmental conservation cause). This hypothesis is also in line with findings by Rabinovich et al. (2009) who contrast the specificity of proenvironmental behaviors versus more abstract and general proenvironmental behaviors.

I surmise that changing the oil in a vehicle and lawn care are specific actions that can have either negative or positive environmental effects, whereas environmental conservation contributions are more general or abstract environmental goals. Thus perhaps sociodemographic variables influence specific environmental behaviors whereas sociopolitical variables influence abstract or general environmental goals.

With respect to a participant's continued participation in proenvironmental behaviors, the motivations underlying such behaviors will partly dictate the benefits each participant derives from participation. Participants are more apt to continue their voluntary participation of proenvironmental behaviors if they see that their participation is positively meaningful and if they derive positive (internal) personal benefits that do not involve the reciprocal exchange of goods or services, i.e., payment (Staw et al. 1980 and Ariely et al. 2009).

Finally, when comparing all three population groups, I found that Mexicans were more odds likely to avoid environmentally harmful products than their Texas Latino and non-Latino white counterparts. The reasoning behind this finding is not known, but not unusual since previous studies have found that U.S and/or Spanish-speaking Latinos (including Mexican-Americans) are more environmentally concerned than other ethnic groups (Klineberg 1998, Burger and Greenburg 2006, and Lopez et al. 2007). So it is plausible to surmise that the avoidance of environmentally harmful products could be related to cultural characteristics. Nonetheless, this finding is important because of erroneous perceptions in the U.S. that Mexicans are not environmentally-conscious. My study provides evidence that Mexicans are not only more environmentally concerned

(see Chapter II) than their U.S. counterparts, but that Mexicans are also more apt to behave in a more environmentally-conscious manner than their U.S. counterparts, by avoiding environmentally harmful products.

Another plausible explanation why Mexicans avoid environmentally harmful products may be that access or availability of environmentally harmful products is limited by country (market influence) or expense. This would however contrast with the agricultural work experience many Mexican immigrants and seasonal workers face in the U.S. (Arcury and Quandt 1998) but supports the reasoning for avoidance behaviors. I believe that proximity to or experience with negative environmental events may influence Mexico's participant responses. In addition to agricultural pesticide and chemical exposure, Mexico's northern border region (where participant colleges and universities are located) experiences a high incidence of maquiladoras and industries that produce environmentally hazardous wastes and byproducts, especially those related to water quality (Brody et al. 2004), yet these industries are poorly regulated.

Mexicans

In my study, I found parent income for Mexican participants influenced lawn care (frequency of fertilizer application), when participants indicated they were responsible for a lawn. Fertilizer leaves behind hazardous trace chemicals that seep into the soil and water via runoff, thus the frequency of fertilizer use is taken as a measure of environmental behavior choices. The frequency of fertilizer use by Mexicans, who indicated they were responsible for a lawn's care, was the same (n=30) between those who did not fertilize in the past year and those who fertilized once or twice in the past

year. The use of fertilizers in my study was influenced by income. Individuals whose parents earned between 10,000-24,999 US dollars were more odds likely to fertilize once or twice a year when compared to individuals who did not know their parent's income. This finding is important because it identifies the specific population that should be targeted. When it comes to fertilizer use, individuals who should be targeted for outreach education regarding the negative environmental effects of fertilizers are those in lower to mid-income brackets. My findings indicate that as income increased, the application of fertilizers appeared to decrease; however, this could be attributed to those with higher incomes paying for lawn maintenance (thus they are not explicitly aware of fertilizer use).

Texas Latinos

The frequency of fertilizer use by Texas Latinos, who indicated they were responsible for lawn care, was influenced by gender. Males were more odds likely to be responsible for lawn care than females. The majority of Texas Latino males (n=79) in my study did not fertilize their lawn during the past year, while 50 respondents did choose to fertilize their lawn once or twice in the past year. Only 17 Texas Latino males in my study fertilized their lawn every 3 months. The reasons for individuals not fertilizing their lawn three or more times a year is not clear. It may be attributed to the amount of labor involved in applying fertilizer or to individuals hiring somebody else to take care of lawn maintenance. For outreach education purposes, special attention should be given to the frequency of fertilizer application.

CONCLUSION

In summary, my study findings suggest that the environmental behaviors of three college and university student participant groups were influenced by both sociodemographic and sociopolitical variables. Participants (Mexicans, Texas Latinos, Texas non-Latino whites) in my study were from the US (Texas) and Mexico (Chihuahua, Tamaulipas, and Coahuila) along the critical Lower Rio Grande Valley, thus they represent an important emerging stakeholder for the future of natural resource conservation in the region. For the combined population group, I found that environmental behaviors which involved paying money for a service or good as opposed to making a donation of time or money, were more associated with sociodemographic variables, while environmental behaviors involving donations of time or money where exchanges of tangible goods (products or services) are nonexistent, were more associated with sociopolitical variables. Results from my study indicate that Mexicans are more environmentally-conscious in their behaviors, particularly their avoidance behaviors, than their U.S. participant counterparts. This is important because misperceptions exist whereby Mexico is oftentimes viewed as disengaged and not concerned about the environment, and evidence from my study suggests otherwise. Thus if natural resource and environmental agencies wish to increase Mexican outdoor recreation participation, efforts should be directed at increasing accessibility for this particular stakeholder.

CHAPTER IV

RECREATIONAL BEHAVIORS AND CONSTRAINTS AMONG THREE POPULATIONS ALONG THE U.S.–MEXICO BORDER

INTRODUCTION

Natural resource managers continually face challenges in managing public natural resources, particularly with emerging stakeholders, oftentimes because very little information is available regarding their recreational attitudes, knowledge, and behaviors. A fundamental problem for natural resource agencies is recognizing and considering stakeholder interests in management and policy decision-making processes (Bromley 1991, Decker et al. 2001). Ultimately, stakeholder perspectives and attitudes [, which influence environmental behaviors (see Chapter III)] will affect the future of natural resource management (Susskind and Cruikshank 1987, Decker et al. 2001). In Chapter III, I reviewed general environmental behaviors and relationships important in programming from a natural resource agency or environmental advocacy group perspective. In this chapter, I will focus my attention specifically to recreational behaviors.

Throughout history, organizations have used the connection between attitudes and behaviors to predict everything from voter outcomes to product success. Marketing strategies use this data to promote agendas and sales. One such assessment of public opinion conducted since the early 1970's is the General Social Survey, which considers sociodemographic, sociopolitical, and general attitude and behavior questions ranging from political affiliation to recreation behavior. The field of environmental psychology

is not far behind, as there is an intricate connection between attitudes and general environmental behaviors, influenced by several factors, among them parenting (Earle 1998, Grønhøj and Thøgersen 2009), sociodemographics (Klineberg et al. 1998), proximity to environmental events (Brody et al. 2004), and educational exposure (Bradley et al. 1997), among others. In the same vein, environmental attitude assessments are often utilized to help predict environmental behaviors, specifically proenvironmental behaviors (Nordlund and Garvill 2002), hence the emergence of environmental marketing. Leisure studies, which considers user preferences for promoting recreational facilities, thus behaviors, has utilized attitudinal research extensively (Johnson et al. 2007) for the purpose of increasing user participation. Understanding differences in stakeholder attitudes, knowledge, and consequently their behaviors, is therefore needed for the overall acceptance and success of management decisions made by wildlife, natural resource, and recreation-related agencies. To implement public outreach programs, which foster partnerships between the agency and its constituents, an understanding of stakeholder attitudes, knowledge, and behavior toward natural resources and the environment is essential. Partnerships formed from these outreach programs will enhance the management of natural resources and increase support for natural resource agencies and their missions (Harris 1985, Duda and Brown 1999, Decker et al. 2001).

Increasingly, Latinos, one of the fastest growing ethnic groups in the U.S., will be an important stakeholder target for environmentally-based recreation agency outreach programs (Lopez et al. 2005). The rapid growth of the Latino population in the United

States (U.S.), specifically in the Southwest, has become increasingly important because of the influence Latinos will have on the future allocation and management of natural resources (Lopez et al. 2005). The field of recreation has invested years of research on Latino recreational preferences and behaviors. They have surpassed other natural resource-related fields in their effort to familiarize themselves with the Latino community; notwithstanding the significance of this research, it has failed to consider key cultural characteristics of the Latino population - cultural characteristics that influence attitude formation and behaviors. Specifically, they have failed to consider that the Mexican-American community, comprising over 80% of Latinos in the U.S., is not monolithic. Exposure in the United States to the education system and labor force participation accelerates may further affect language, income, family values, and political activity (Burroughs and Reeff 1996, Marín and Gamba 1996, Schultz et al. 2000). Extant research notwithstanding, there is little knowledge regarding Latinos in the U.S., their attitudes toward natural resources, wildlife, and the environment, their environmental and conservation behaviors, and their recreational behaviors and preferences. Previous studies in these disciplines have failed to adequately measure U.S. Latino attitudes and behaviors in these domains.

The Texas–Mexico border is a significant entry point for Mexican-American immigrants living in the U.S. It is also an important wildlife corridor. The vitality of international transborder wildlife corridors is important for the preservation of migratory species along an expanse separated by political and cultural differences (Goodwin 2000, Fernandez and Carson 2002, Valdez et al. 2006). The critical region between the United

States and Mexico is influenced by three major population groups: Mexicans, U.S. Latinos, and U.S. non-Latino whites. Like their U.S. Latino counterparts, Mexicans lag behind in education completion (Diaz Bautista 2003) and share similar geopolitical histories *vis* a *vis* Spanish conquest, defeat in war with U.S., and prevalence of poverty. Although Latinos on both sides of the border share many similarities, very little is known about their recreational behaviors, especially with an increase in violence along this region, and specific comparisons between the three major border stakeholders (Mexicans, U.S. Latinos, and U.S. non-Latino whites) have not been made. Thus, the objective of my study was to determine and compare the recreational behaviors among these three major stakeholders along the U.S.-Mexico border.

STUDY AREA

Mexico Study Area

I surveyed Mexican community college and university students from eight academic institutions: Tecnológico de Monterrey, Campus Ciudad Juarez (Ciudad Juarez, Chihuahua); Universidad Autónoma de Coahuila, Unidad Norte (Piedras Negras, Coahuila); Universidad Autónoma del Noreste (Piedras Negras, Coahuila); Universidad Autónoma de Piedras Negras (Piedras Negras, Coahuila); Universidad Autónoma de Tamaulipas, Unidad Reynosa (Reynosa, Tamaulipas); Universidad Mexico Americana del Norte, A.C., (Ciudad Reynosa, Tamaulipas); Universidad Pedagógica Nacional (Piedras Negras, Coahuila); Universidad Valle del Bravo, Campus Nuevo Laredo (Nuevo Laredo, Tamaulipas). I was interested in sampling only college students because I wanted to control for education as an independent variable. I selected these community

colleges and universities based on their location near and along the U.S.–Mexico border. Thus, my study sample was a purposive sample (Babbie 1990) because it focused exclusively on identifying the natural resource and environmental attitudes of educated Mexicans who lived near or along the United States–Mexico border.

United States Study Area

I surveyed Texas Latino community college and university students from seven academic institutions: Coastal Bend Community College (Alice, TX); Coastal Bend Community College (Beeville, TX); Coastal Bend Community College (Kingsville, TX); El Centro Community College (Dallas, TX); El Paso Community College (El Paso, TX); and University of Texas at Brownsville (Brownsville, TX). Like with the Mexican sample, I was interested in sampling only college students to control for education as an independent variable. I selected these community colleges and universities because they were located in highly Latino-populated areas (Hispanic Serving Institutions, >50% of students Latinos). Thus, my study sample was a purposive sample (Babbie 1990) because it focused exclusively on identifying the natural resource and environmental attitudes of educated Texas Latinos of Mexican descent.

METHODS

Survey Development

I derived an index of environmental behavior consisting of questions from three commonly used indices of environmental concern and behavior: General Social Survey (2003), New Ecological Paradigm (NEP; Dunlap et al. 2000), and the Texas Biennial Environmental Survey (TBES; Klineberg 1998a, b). For the purposes of this chapter, I

will focus on my findings from the TBES (Klineberg 1998). I selected 18 questions from the TBES to determine outdoor recreation participation and constraints (Table 4.1). Responses for the TBES questions were in various formats: Likert format (1–3 with 1 = Several times, 2 =Once or twice, 3 = Not at all); yes/no format (1 = yes, 2 = no), and please specify format. I divided the variables included in my survey into two categories: sociodemographic and sociopolitical. Several sociodemographic (ethnicity, religious preference, religious participation, etc.) and sociopolitical (political party affiliation, political participation, etc.) questions were deemed either out of context due to linguistic and cultural differences or were considered discriminatory towards Mexicans and were omitted from my Mexican survey. Questions omitted were not used in the analysis for any population. Sociodemographic variables included (1) ethnicity (Latino, non-Latino white; used only with the Texas population), (2) sex (M, F), (3) age (20 or younger, 21-30, 31 and older), (4) combined parent income ($24,999 or lower, $25,000-74,999, $75,000 or higher; an equivalent scale was used in Mexican currency based on the current market currency rate, $10 Mexican pesos to $1 United States Dollar, 2006), (5) father's education level (less than a high school diploma, high school diploma, technical school and/or some college, college degree, and graduate degree), (6) mother's education level (identical to father's educational attainment), and (7) place of origin group (Texas Latino, Texas non-Latino white, and Mexican). Sociopolitical variables included (1) environmental orientation (active environmentalist, sympathetic, neutral, unsympathetic, don't know), and (2) political candidate's position on environmental issues (very important, somewhat important, not very important). The survey instrument

was translated into Spanish and provided to the university professors and graduate students in Mexico, who reviewed and edited the survey. This procedural step was part of a collaborative grant project between US and Mexican universities. Texas A&M University's Institutional Review Board (protocol No. 2005-021) approved study protocols.

Data Collection

In Spring 2005, I compiled e-mail addresses for all faculty at targeted (proximity to border and/or Hispanic serving) academic institutions in Texas. I sent an email message, requesting assistance in conducting my survey during regularly scheduled class times, to all faculty members. Faculty members that responded to the initial e-mail contact and that agreed to participate chose to administer the surveys themselves. I sent each faculty member instructions on how to conduct the survey and an informed consent form for each student participant, along with the appropriate number of surveys, and a prepaid return envelope. Following provided survey protocol, professors and graduate students distributed and collected surveys from various universities along the U.S. – Mexico border. In Fall 2006, I collaborated on a project grant and worked with Texas and Mexico university professors and graduate students.

Table 4.1. Texas Biennial Environmental Survey questions used in determining outdoor recreation participation and constraints among Texas, USA, and Mexico students, (*n* = 995), 2010.

Questions
[People] have a love affair with sports and outdoor recreation (hiking, boating, fishing, hunting, camping, etc.). During the past year, how often have you personally participated in any of the following leisure activities?
1. Gone swimming in a lake, river, or bay in Texas? [a]
2. Visited a state park or other natural area in Texas? [a]
3. Gone boating or fishing somewhere in Texas? [a]
Below is a list of reasons why people might not participate in outdoor activities (e.g. example: hiking, boating, fishing, etc.) as often as they want. Have the following reasons kept you from participating in any outdoor activity? For each reason, please indicate whether it has kept you from participating in any outdoor activity.
1. Not enough time. [b]
2. Not enough money. [b]
3. Personal health reasons. [b]
4. No one to do activities with. [b]
5. Inadequate Transportation. [b]
6. Crowded activity areas. [b]
7. Personal safety problems in activity areas. [b]

Table 4.1. Continued.

Questions
8. Inadequate facilities in activity areas. [b]
9. Poorly maintained activity areas. [b]
10. Pollution problems in activity areas. [b]
11. Inadequate information on places to do activities. [b]
12. I have a physically limiting condition and do not have assistance or equipment to do activities. [b]
13. A member of my household has a disability that limits my participation in outdoor recreation. [b]
14. Outdoor pests, such as mosquitoes. [b]
15. Other. [c]

[a] 1 = Several times, 2 = Once or twice, 3 = Not at all
[b] 1 = Yes, 2 = No
[c] Please specify

Data Analysis

For the Texas population, I selected surveys where respondents identified themselves as Latino for the Latino population and as non-Latino white for the non-Latino white population. I used the selected surveys for further analyses. For the Mexico population, I included all surveys since distinctions based on ethnicity are not valid and considered discriminatory. I compared the outdoor recreation participation and the constraints to outdoor recreation participation (based on participant responses to

18 outdoor recreation participation and constraints questions; Table 4.1) among the three populations, to nine sociodemographic variables (sex, age, environmental orientation, political candidate's environmental position, father's educational attainment, mother's educational attainment, student income, parent income, and place of origin), using ordinal, and binary logistical regression in SPSS 16.0. I calculated odds ratios for significant ($P < 0.05$) model variables (Hosmer and Lemeshow 2000). The odds ratio is one set of odds divided by another. For example, an odds ratio of 2.5 for men (gender is the predictor) owning a boat (response variable) is 2.5 times greater when compared to women (Hosmer and Lemeshow 2000). In other words, the odds ratio compares one unit of change in one predictor relative to another.

RESULTS

Surveys Collected

For the Texas population, I mailed surveys (n = 1,353) to 27 Texas community college and university professors who were willing to participate in the study. Of these, seven professors did not return surveys and 20 professors returned completed surveys (n = 755, final response rate 56%). Of the 755 surveys received, 16% (n = 120) were from non-Latino participants. This non-Latino group was further divided into two groups: non-Latino white (n = 75) and other (n = 45). The sociodemographic profile for the non-Latino white participants was the following: age (mean = 27.86 yr, SD = 9.69), gender (69%F), classification (30% freshman, 35% sophomore, 15% junior, 15% senior, 5% other), and combined parental income (median = $75,000-109,000 USD, n = 48). The remaining surveys (84%, n = 635) were from Latino participants whose

sociodemographic profile was the following: age (mean = 25.21 yr, SD = 7.90), gender (69%F), classification (25% freshman, 39% sophomore, 21% junior, 12% senior, 3% other), and combined parental income (median = $25,000-49,999 USD, *n* = 420).

For the Mexican population, (*n* = 284), eight universities were randomly selected from among all universities near or on the Mexico–Texas, United States border region. Because Mexican universities vary in their organizational, administrative and procedural structure, Mexico university professors and graduate students obtained 100% participant compliance from the selected groups. The sociodemographic profile for the Mexican participants was the following: age (mean = 21.88 yr, SD = 4.39), gender (55%F), classification (21% freshman, 32% sophomore, 22% junior, 19% senior, 6% other), and combined parental income (median = $9,999 USD and under, *n* = 247).

Predictors of Outdoor Recreation Participation and Constraints

Recreation Participation.—The independent variables in my study did not influence the three, outdoor recreational behaviors examined (Table 4.1).

Constraints, Combined Population.—When all three populations were combined, a total of three sociodemographic variables (*parent income, age, place of origin*) and one sociopolitical variable (*environmental orientation*) were important in predicting outdoor recreation participation constraints among Texas and Mexico college student study participants ($P < 0.05$). Constraints to outdoor recreation participation are discussed in terms of each *independent variable*.

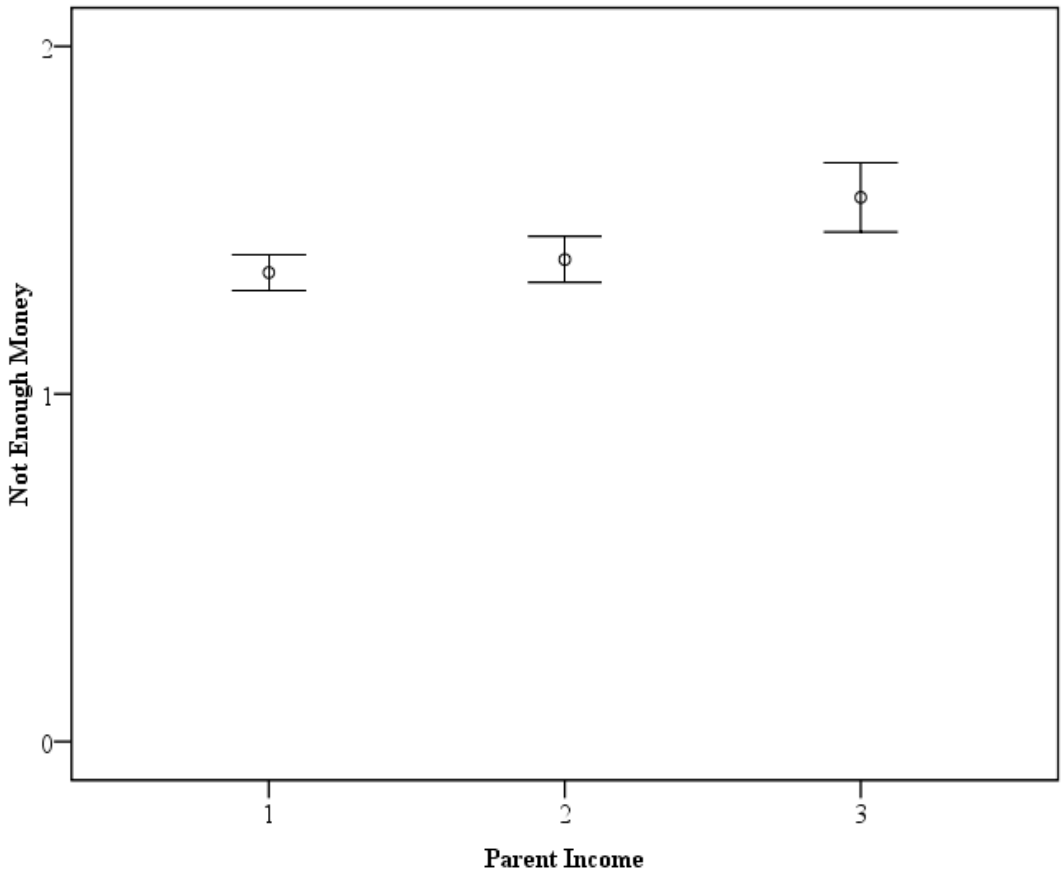
Parent income ($24,999 or lower, $P = 0.004$, and 25,000-74,999, $P = 0.040$; Table 4.2; Figure 4.1) influenced Texas and Mexico student participation in outdoor

recreation activities. Not having enough money was as a constraint to participation. Texas and Mexico participants whose parents had a low- to mid- combined income were more odds likely (≈ 0.421 and ≈ 0.561 odds, respectively) to state that not having enough money was a constraint to their outdoor recreation participation, versus participants whose parents earned higher incomes.

Table 4.2. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "not enough money" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Parent Income (U.S. Dollars)					
24,999 or lower	-0.865	0.004*	0.421	0.234	0.759
25,000-74,999	-0.578	0.040*	0.561	0.323	0.973
75,000 or higher	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=$24,999 or lower, 2=$25,000-74,999, 3=$75,000 or higher

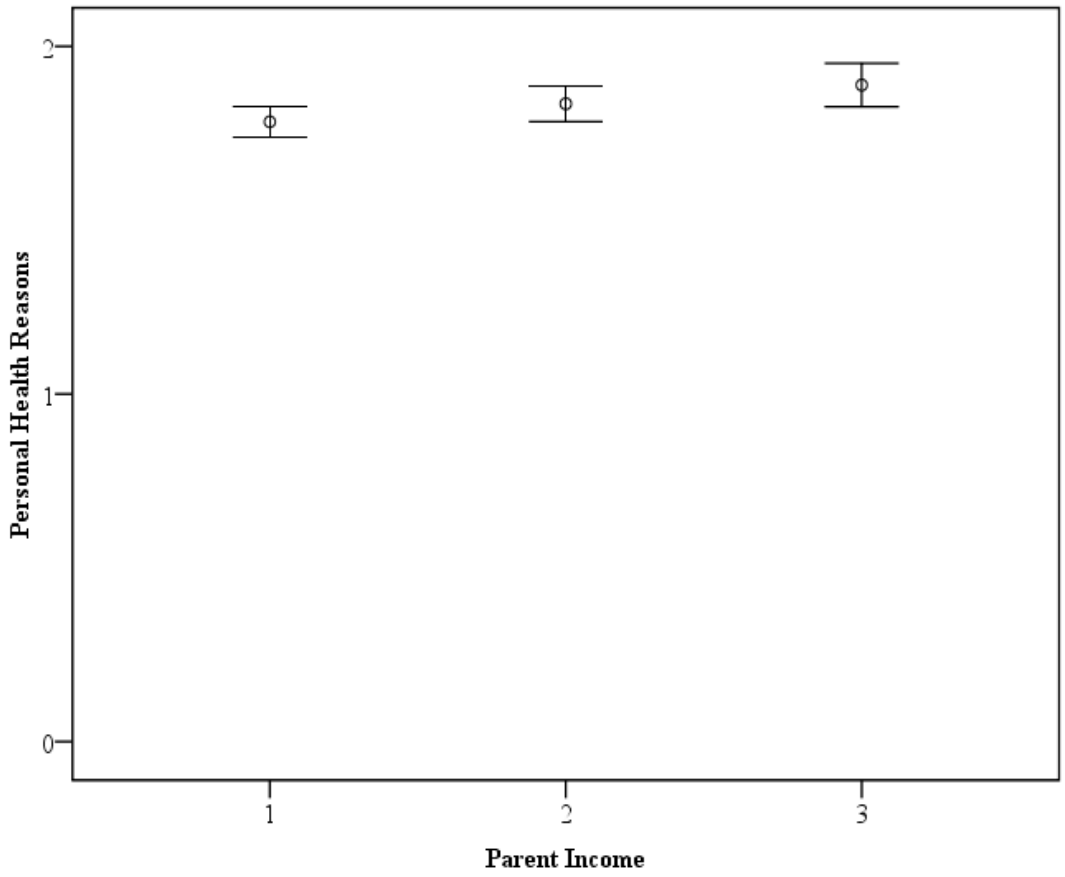
Figure 4.1. Not Enough Money mean score for combined population by parent income, 2010.

Personal health reasons was also a stated constraint to outdoor recreation participation in my study. *Parent income* (24,999 or lower, $P = 0.013$; Table 4.3; Figure 4.2) influenced participation in this regard. Participants from all population groups

Table 4.3. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "personal health reasons" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Parent Income (U.S. Dollars)					
24,999 or lower	-1.094	0.013*	0.335	0.141	0.797
25,000-74,999	-0.705	0.102	0.494	0.212	1.150
75,000 or higher	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=$24,999 or lower, 2=$25,000-74,999, 3=$75,000 or higher

Figure 4.2. Personal Health Reasons mean score for combined population by parent income, 2010.

Inadequate transportation was a constraint to outdoor recreation participation in

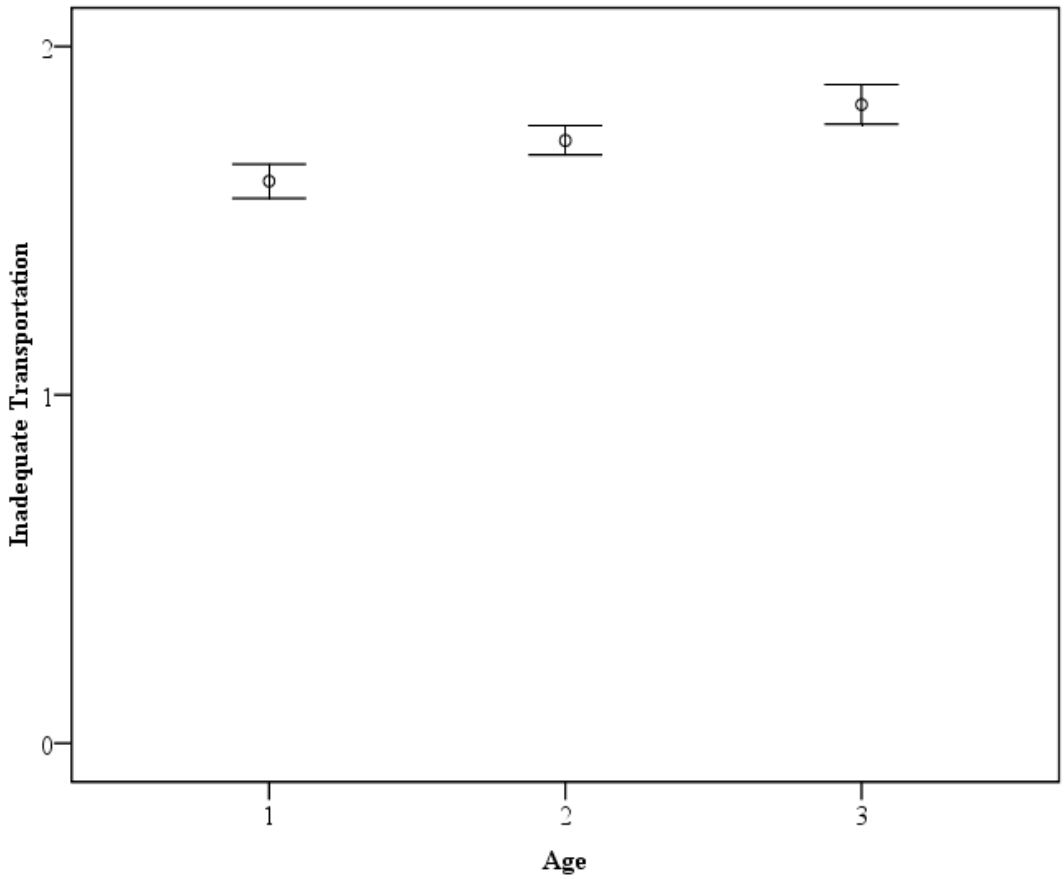
whose parents had a lower income were also more odds likely to state that personal health reasons ($24,999 or lower, ≈ 0.335 odds) influenced their outdoor recreation participation.

Inadequate transportation was a constraint to outdoor recreation participation in my study sample. Three independent variables influenced study participants in this regard: *age*, *parent income*, and *place of origin*. When all three population groups were compared, the youngest *age* (20 or younger, $P = 0.005$, Table 4.4; Figure 4.3) group was more odds likely (≈ 0.352 odds) to state that inadequate transportation influenced their participation in outdoor recreation activities. Participants with lower *parent income* (24,999 or lower, $P = 0.007$; Table 4.4; Figure 4.4) were more odds likely (≈ 0.361 odds) to indicate that inadequate transportation limited their outdoor recreation participation, compared to participants whose parents earned higher incomes. *Place of origin* (Mexican, $P = 0.028$; Table 4.4; Figure 4.5) also influenced student outdoor recreation participation. Mexican students were more odds likely (≈ 0.302 odds) to state that inadequate transportation limited their outdoor recreation participation.

Table 4.4. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "inadequate transportation" as a constraint for the combined population, 2010.

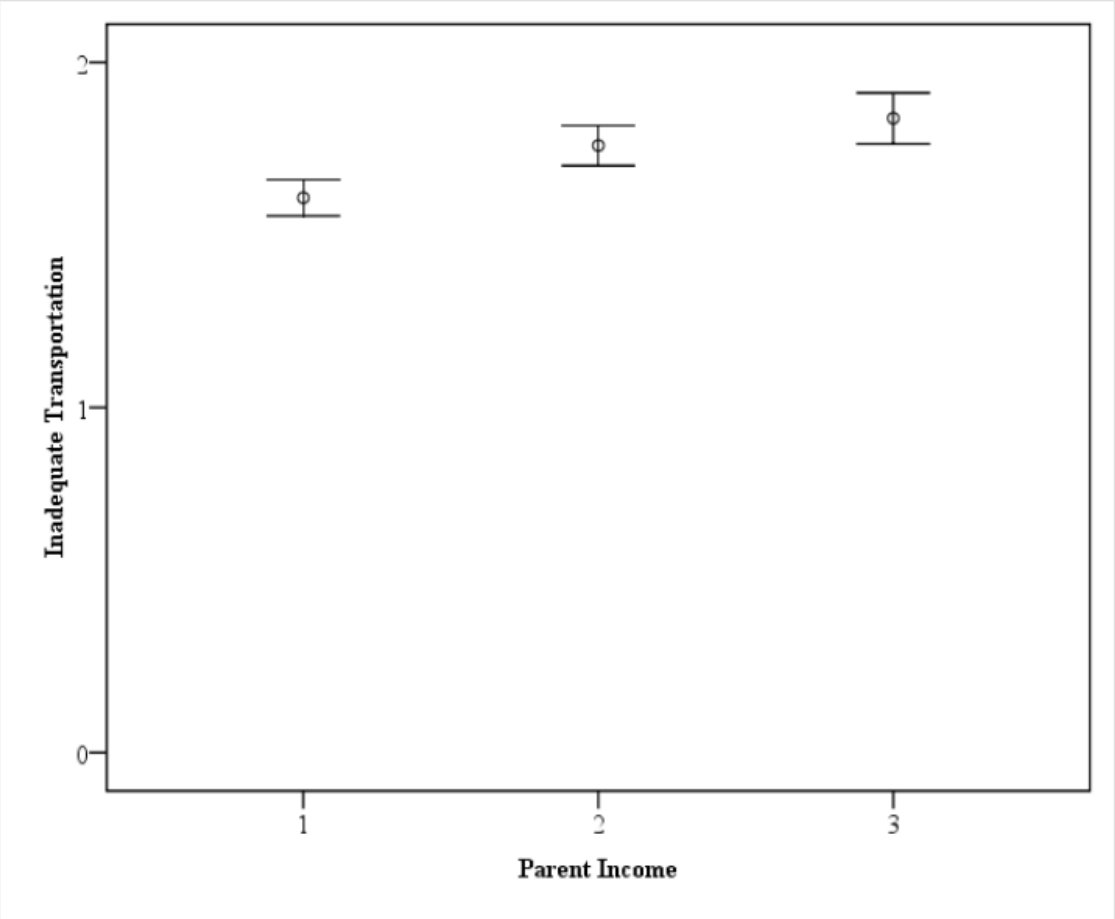
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Age					
20 or younger	-1.045	0.005*	0.352	0.170	0.729
21-30	-0.467	0.199	0.627	0.308	1.277
31 or older	0	-	-	-	-
Parent Income (U.S. Dollars)					
24,999 or lower	-1.020	0.007*	0.361	0.171	0.760
25,000-74,999	-0.527	0.161	0.590	0.283	1.233
75,000 or higher	0	-	-	-	-
Place of Origin					
Mexican	-1.196	0.028*	0.302	0.104	0.881
Texas Latino	-0.512	0.327	0.599	0.215	1.669
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



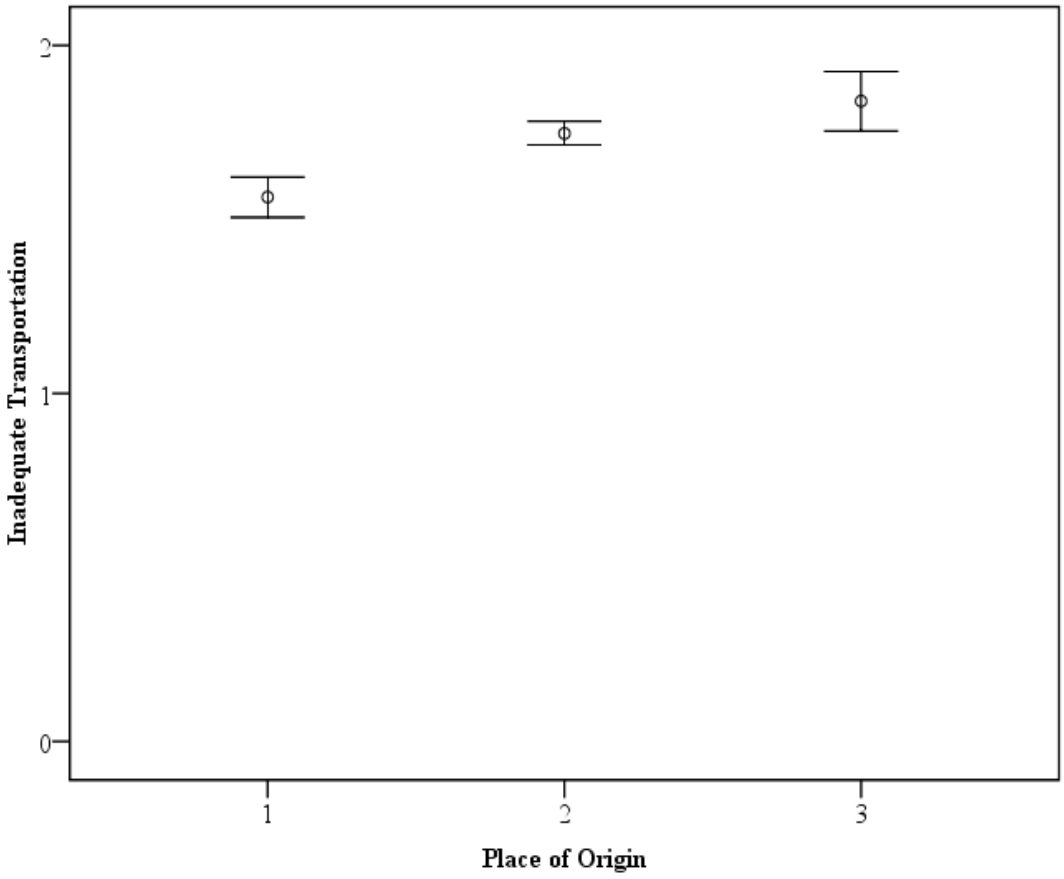
1=20 or younger, 2=21 to 30, 3=31 or older

Fig. 4.3. Inadequate Transportation mean score for all populations by age, 2010.



1=$24,999 or lower, 2=$25,000-74,999, 3=$75,000 or higher

Figure 4.4. Inadequate Transportation mean score for combined population by parent income, 2010.



1=Mexican, 2=Texas Latino, 3=Texas Non-Latino White

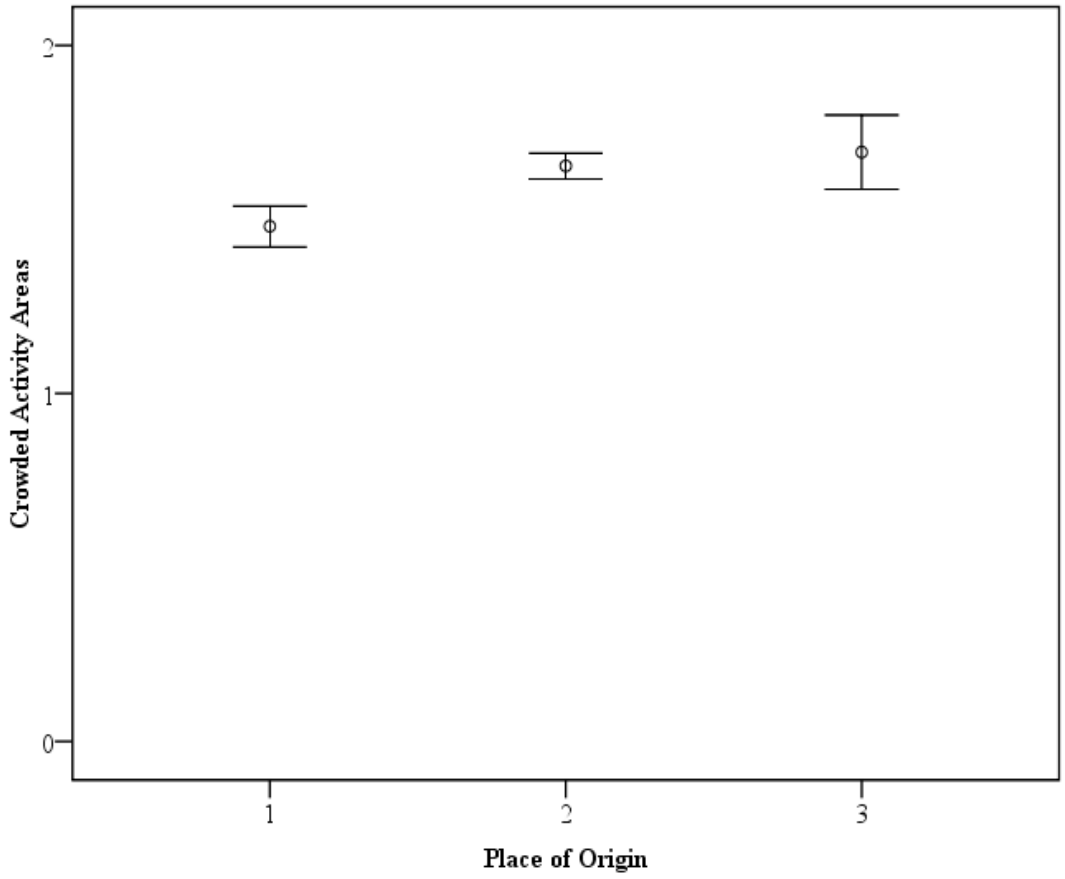
Fig. 4.5. Inadequate Transportation mean score for all populations by place of origin, 2010.

Crowded activity areas were also a constraint to Texas and Mexico college student outdoor recreation participation when influenced by *place of origin* (Mexican, P = 0.023; Table 4.5; Figure 4.6). Mexican students were more odds likely (≈ 0.405 odds) to have their participation constrained by crowded activity areas compared to their Texas Latino and non-Latino white counterparts.

Table 4.5. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "crowded activity areas" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-0.904	0.023*	0.405	0.185	0.885
Texas Latino	-0.028	0.937	0.972	0.478	1.976
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

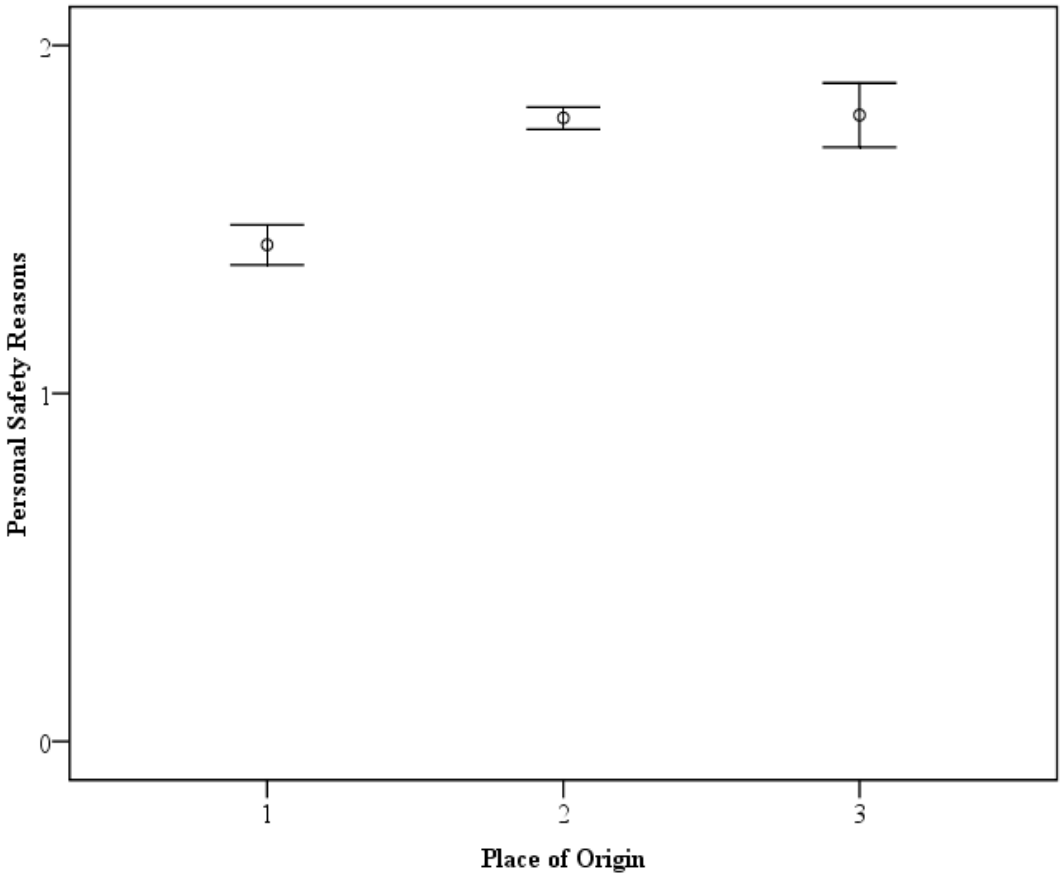
Figure 4.6. Crowded Activity Areas mean score for combined population by place of origin, 2010.

Personal safety reasons were listed as constraints to outdoor recreation participation when a participant's *place of origin* (Mexican, $P < 0.001$; Table 4.6; Figure 4.7) was examined. Mexican participants were more odds likely (≈ 0.152 odds) to state they were constrained by personal safety reasons than their U.S. counterparts.

Table 4.6. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "personal safety reasons" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-1.883	0.000*	0.152	0.058	0.398
Texas Latino	-0.090	0.846	0.914	0.368	2.267
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

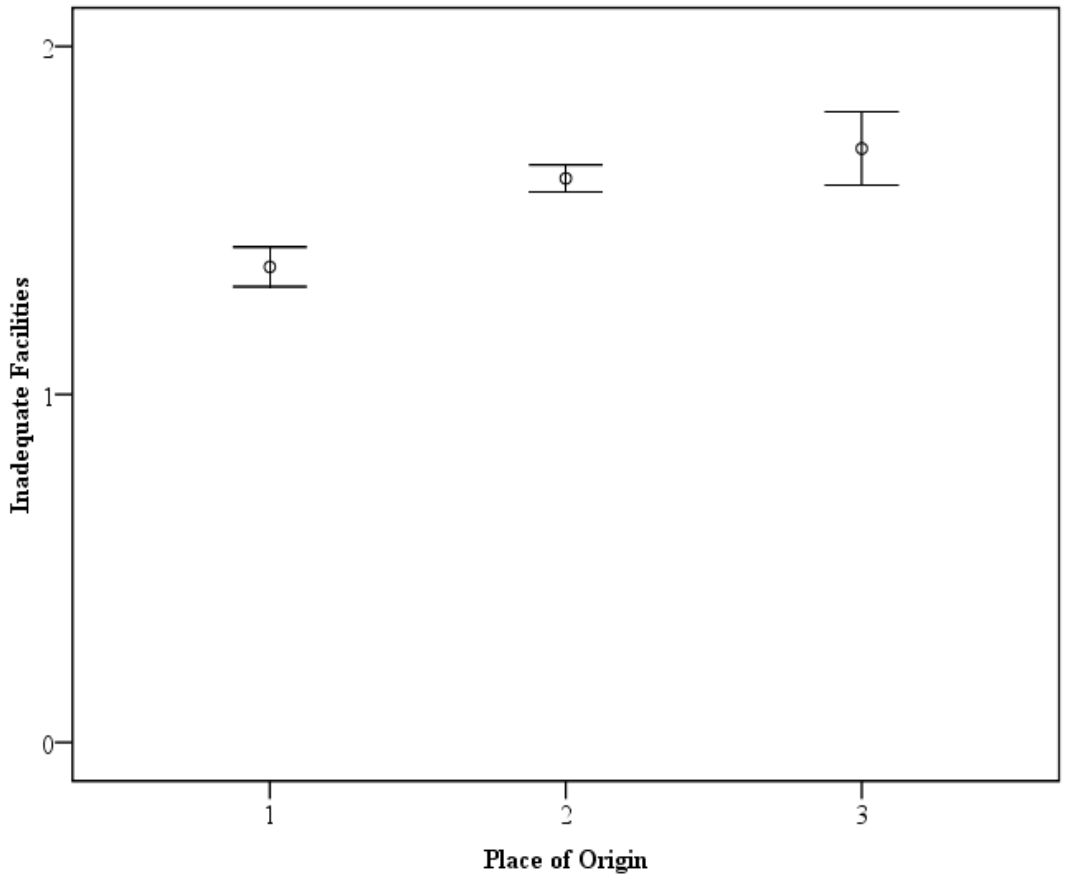
Figure 4.7. Personal Safety Reasons mean score for combined population by place of origin, 2010.

Texas and Mexico college students' outdoor recreation participation was influenced by *place of origin* (Mexican, $P = 0.008$; Table 4.7, Figure 4.8) with inadequate facilities as a constraint to participation. Mexican students were more odds likely (≈ 0.341 odds) to be constrained by inadequate facilities than their Texas Latino and non-Latino white counterparts.

Table 4.7. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "inadequate facilities" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-1.076	0.008*	0.341	0.154	0.754
Texas Latino	0.018	0.960	1.019	0.495	2.097
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

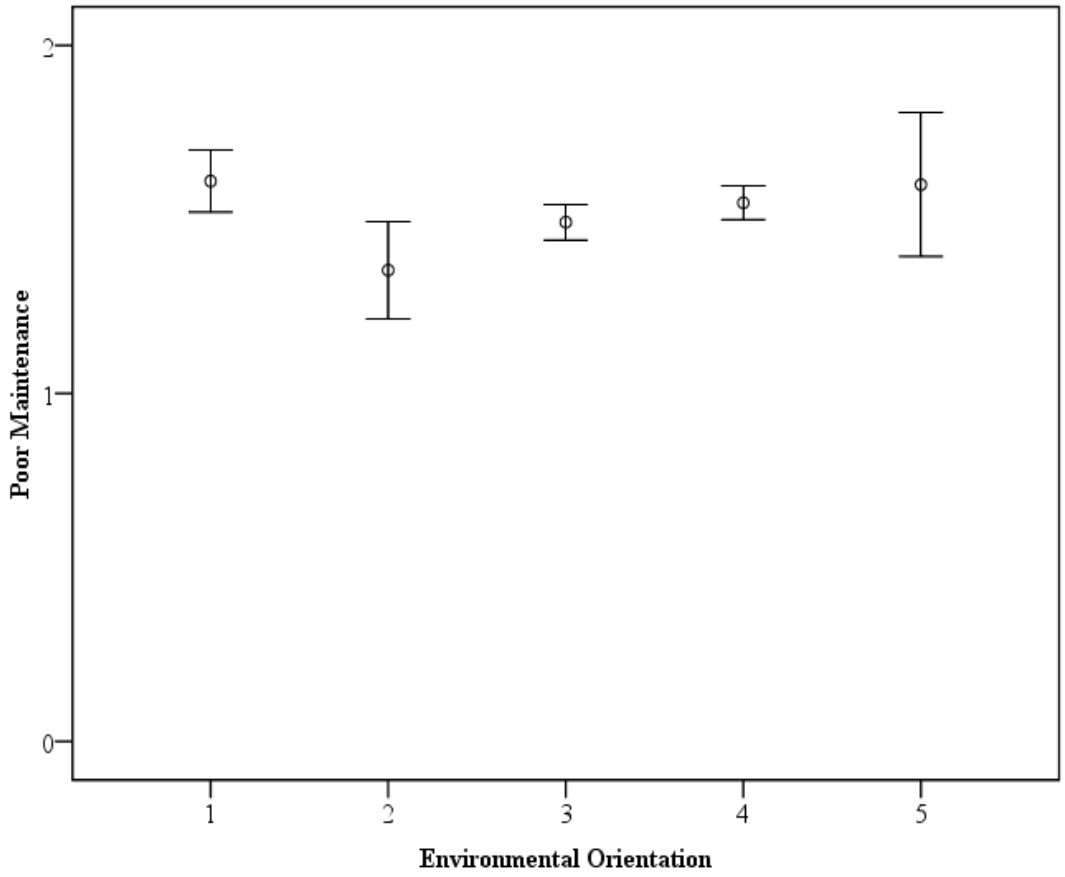
Figure 4.8. Inadequate Facilities mean score for combined population by place of origin, 2010.

Environmental orientation (Active, $P = 0.039$; Table 4.8; Figure 4.9) influenced Texas and Mexico college and university student outdoor recreation participation. The study indicates that poor maintenance also acts as a constraint to participation. Students from all population groups who considered themselves active environmentalists were more odds likely (≈ 0.224 odds) to have their outdoor recreation participation constrained by poorly maintained facilities. However, poor maintenance did not have the same effect on participants who did not consider themselves active environmentalists (sympathetic, neutral, and unsympathetic) and those who had not yet formed a specific environmental orientation. Poor maintenance also constrained outdoor recreation participation when a students' *place of origin* (Mexican, $P = 0.035$; Table 4.8; Figure 4.10) was examined. Mexican student participants were more odds likely (≈ 0.433 odds) to be constrained by poorly maintained facilities, compared to Texas Latino and non-Latino white participants in my study.

Table 4.8. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "poor maintenance" as a constraint for the combined population, 2010.

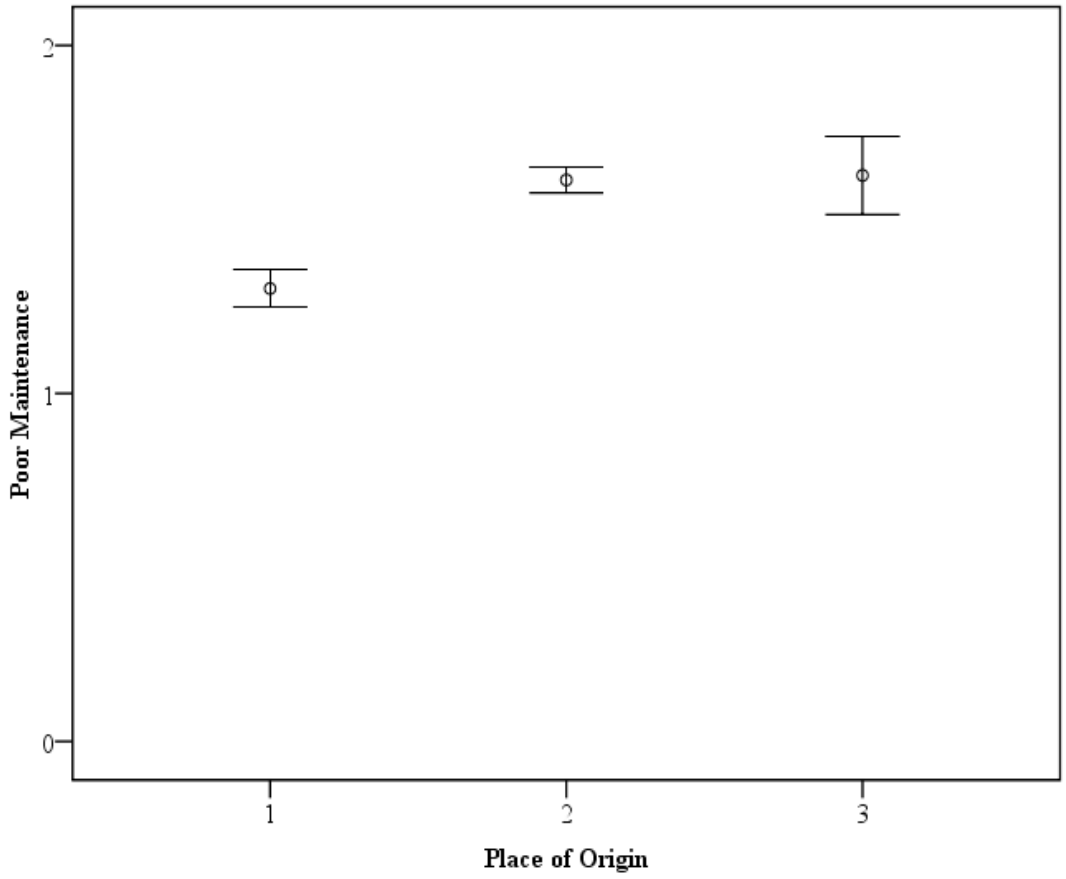
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Environmental Orientation					
Don't Know	-0.368	0.559	0.692	0.201	2.381
Active	-1.494	0.039*	0.224	0.054	0.924
Sympathetic	-0.785	0.179	0.456	0.145	1.432
Neutral	-0.506	0.385	0.603	0.193	1.888
Unsympathetic	0	-	-	-	-
Place of Origin					
Mexican	-0.838	0.035*	0.433	0.199	0.942
Texas Latino	0.383	0.281	1.467	0.731	2.945
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Don't Know, 2=Active, 3=Sympathetic, 4=Neutral, 5=Unsympathetic

Figure 4.9. Poor Maintenance mean score for combined population by environmental orientation, 2010.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

Figure 4.10. Poor Maintenance mean score for combined population by place of origin, 2010.

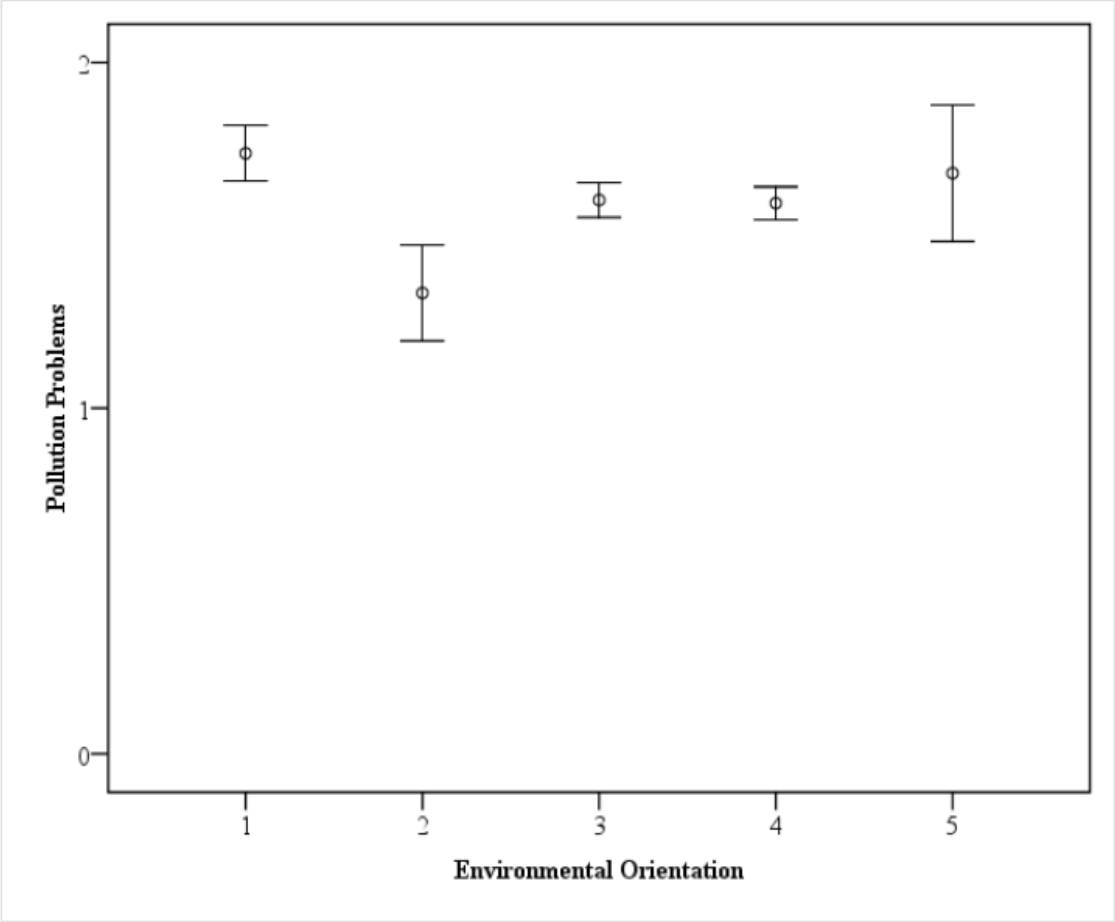
Environmental orientation (Active, $P = 0.018$; Table 4.9; Figure 4.11) influenced Texas and Mexico college and university student outdoor recreation participation with pollution problems as a constraint to participation. Participants who identified themselves as active environmentalists were more odds likely (≈ 0.159 odds) to have their outdoor recreation participation constrained by pollution in outdoor recreation areas compared to participants who identified themselves otherwise (sympathetic, neutral, not sympathetic, and don't know). Pollution problems were also a constraint when p*lace of origin* (Mexican, $P < 0.001$; Table 4.9; Fig, 4.12) influenced Texas and Mexico college student outdoor recreation participation. Mexican students were more odds likely (≈ 0.232 odds) to be influenced by pollution in outdoor recreation areas versus Texas origin students.

Place of origin (Mexican, $P = 0.005$; Table 4.10; Figure 4.13) influenced Texas and Mexico college student outdoor recreation participation with inadequate information as a constraint. Mexican students in my sample were more odds likely (≈ 0.329 odds) to be influenced by inadequate information compared to Texas Latino and non-Latino white students.

Table 4.9. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "pollution problems" as a constraint for the combined population, 2010.

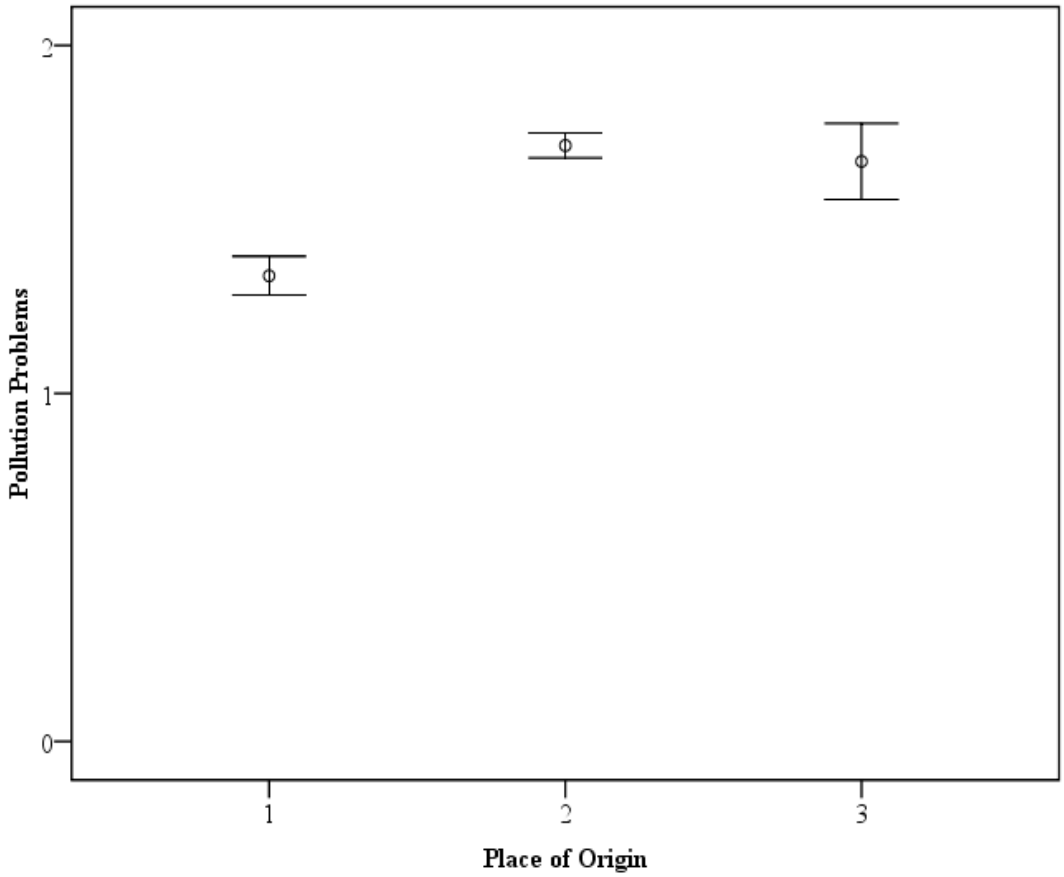
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Environmental Orientation					
Don't Know	-0.149	0.831	0.862	0.221	3.368
Active	-1.838	0.018*	0.159	0.035	0.727
Sympathetic	-0.492	0.445	0.612	0.173	2.158
Neutral	-0.646	0.314	0.524	0.149	1.843
Unsympathetic	0	-	-	-	-
Place of Origin					
Mexican	-1.462	0.000*	0.232	0.103	0.521
Texas Latino	0.062	0.868	1.064	0.513	2.209
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Don't Know, 2=Active, 3=Sympathetic, 4=Neutral, 5=Unsympathetic

Figure 4.11. Pollution Problems mean score for combined population by environmental orientation, 2010.



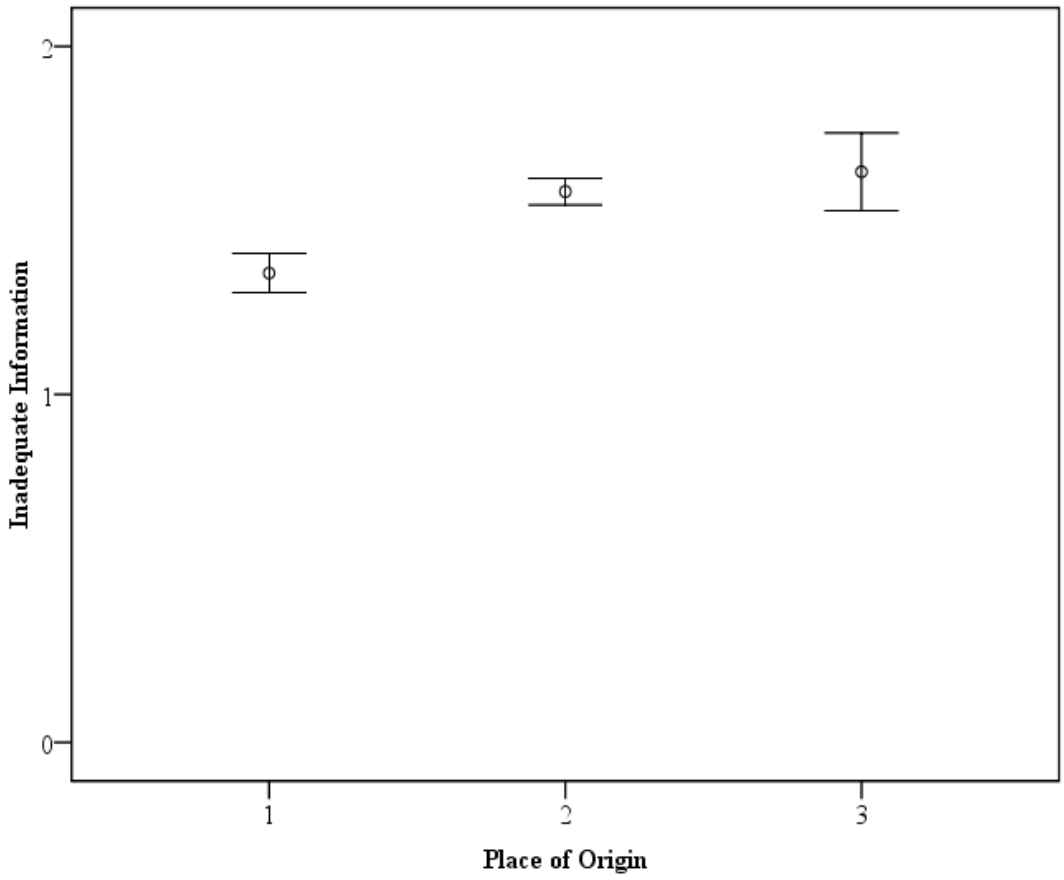
1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

Figure 4.12. Pollution Problems mean score for combined population by place of origin, 2010.

Table 4.10. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "inadequate information" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-1.111	0.005*	0.329	0.152	0.715
Texas Latino	-0.359	0.310	0.698	0.349	1.396
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

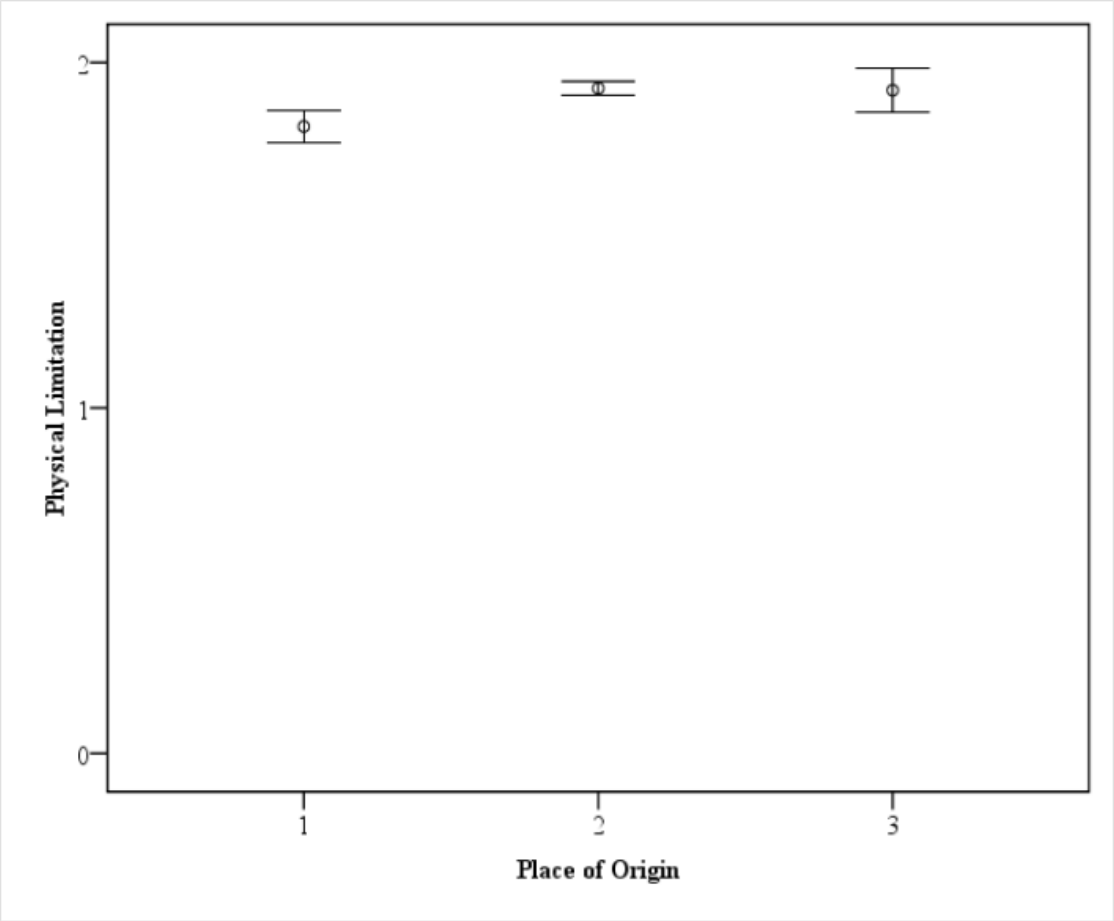
Figure 4.13. Inadequate Information mean score for combined population by place of origin, 2010.

A physical limitation (Mexican, $P = 0.017$; Table 4.11; Figure 4.14) was a constraint to outdoor recreation participation when *place of origin* was examined. Asked whether a physical limitation influenced their outdoor recreation participation, Mexican students were slightly more odds likely (≈ 0.073 odds) to say yes, compared to their Texas Latino and non-Latino white counterparts.

Table 4.11. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "physical limitation" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-2.614	0.017*	0.073	0.008	0.631
Texas Latino	-1.299	0.230	0.273	0.033	2.277
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

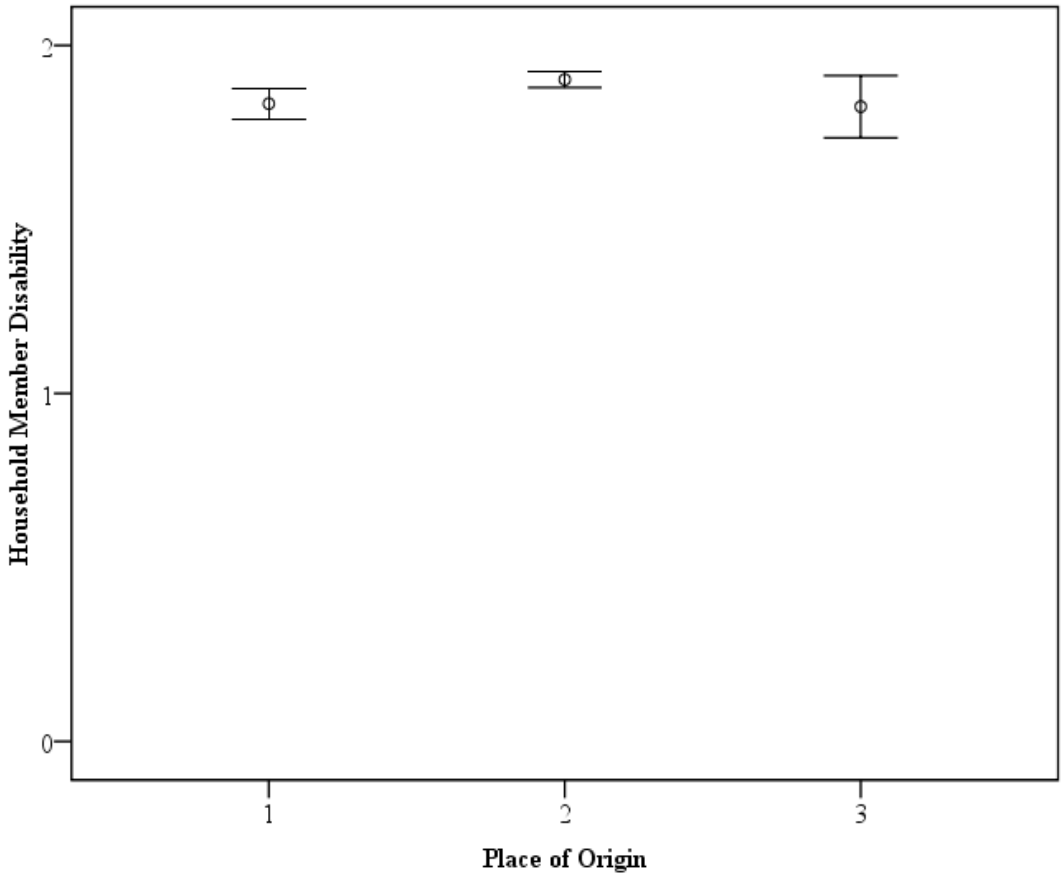
Figure 4.14. Physical Limitation mean score for combined population by place of origin, 2010.

Household member disability (Texas Latino, $P = 0.035$; Table 4.12; Figure 4.15) was a constraint when *place of origin* influenced Texas college student outdoor recreation participation. Texas Latinos were slightly more odds likely (≈ 2.976 odds) to indicate that a household member's disability had not constrained their outdoor recreation participation, when compared to Texas non-Latino white and Mexican participants.

Table 4.12. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "household member disability" as a constraint for the combined population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Place of Origin					
Mexican	-0.152	0.778	0.859	0.298	2.475
Texas Latino	1.091	0.035*	2.976	1.081	8.192
Texas non-Latino white	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Mexican, 2=Texas Latino, 3=Texas non-Latino white

Figure 4.15. Household Member Disability mean score for combined population by place of origin, 2010.

Constraints, Mexican Population.—The independent variables (sex, age, environmental orientation, political candidate's environmental position, mother's educational attainment, father's educational attainment, student income and parent income) included in this study did not exclusively influence Mexican outdoor recreation participation.

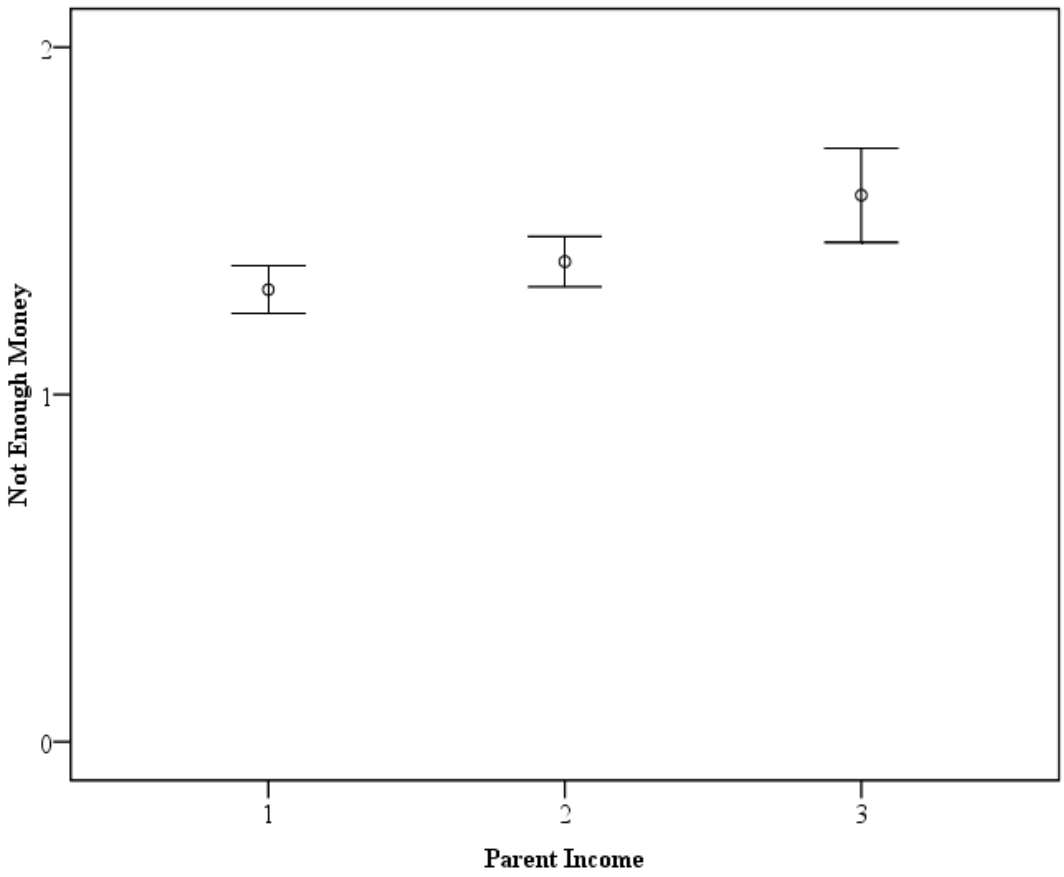
Constraints, Texas Latino Population.—Texas Latino student outdoor recreation participation constraints were influenced by three factors (place of origin was omitted from this analysis), *parent income*, *age*, and *environmental orientation*. Each constraint is discussed in relation to corresponding *independent variables*.

Not enough money was a constraint to student outdoor recreation participation when *parent income* ($24, 999 or lower, $P = 0.002$ and $25,000-74, 999, $P = 0.040$; Table 4.13; Figure 4.16) was considered. In general, Texas Latino students whose *parent income* was $74,999 or less were more odds likely (≈ 0.296 and 0.484 odds) to affirm that not having enough money had kept them from participating in outdoor recreation activities, compared to Texas Latino participants whose parents earned $75,000 or above.

Table 4.13. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "not enough money" as a constraint for the Texas Latino population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Parent Income (U.S. Dollars)					
24,999 or lower	-1.217	0.002*	0.296	0.139	0.631
25,000-74,999	-0.726	0.040*	0.484	0.243	0.966
75,000 or higher	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=$24,999 or lower, 2=$25,000-74,999, 3=$75,000 or higher

Figure 4.16. Not Enough Money mean score for Texas Latinos by parent income, 2010.

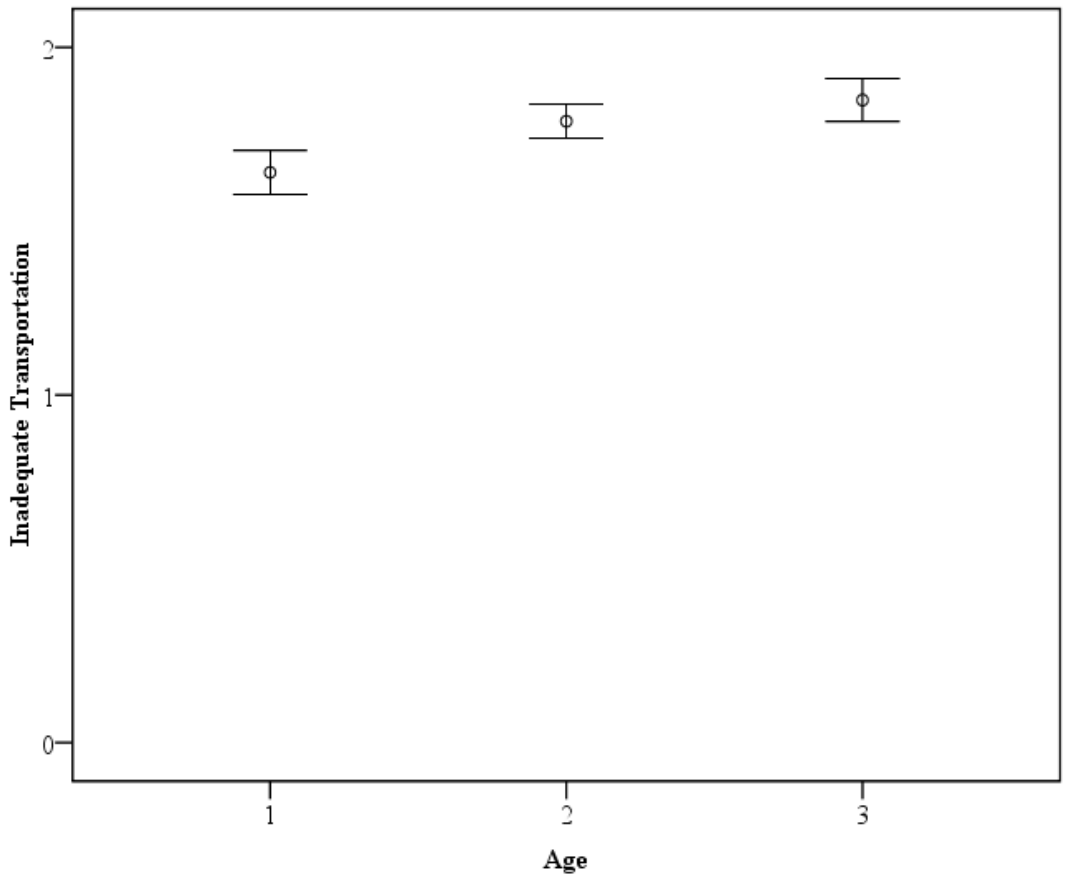
Inadequate transportation was a constraint to outdoor recreation participation when *age* and *parent income* were influential factors. *Age* (20 or younger, $P = 0.025$; Table 4.14, Figure 4.17) influenced student participation constraints. The younger Texas Latino participants, those who were 20 years old or younger, were more odds likely (≈ 0.360 odds) to have inadequate transportation limit their participation compared to Texas Latino students who were 21 years or older. *Parent income* ($24,999 or lower, $P = 0.013$; Table 4.14; Figure 4.18) influenced student outdoor recreation participation constraints as well. Students whose parents earned $24,999 or below were more odds likely (≈ 0.290 odds) to indicate that inadequate transportation had influenced their outdoor recreation participation, compared to other students whose parents earned $25,000 and above.

Physical limitations, as constraints to student outdoor recreation participation, were influenced in part by a students' *environmental orientation* (Sympathetic, $P = 0.006$; Table 4.15, Figure 4.19). Participants who identified themselves as sympathetic to environmental causes were more odds likely (≈ 18.416 odds) to indicate that a physical limitation had not influenced their outdoor recreation participation, compared to Texas Latino students with other environmental orientations (don't know, active, neutral, and unsympathetic).

Table 4.14. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "inadequate transportation" as a constraint for the Texas Latino population, 2010.

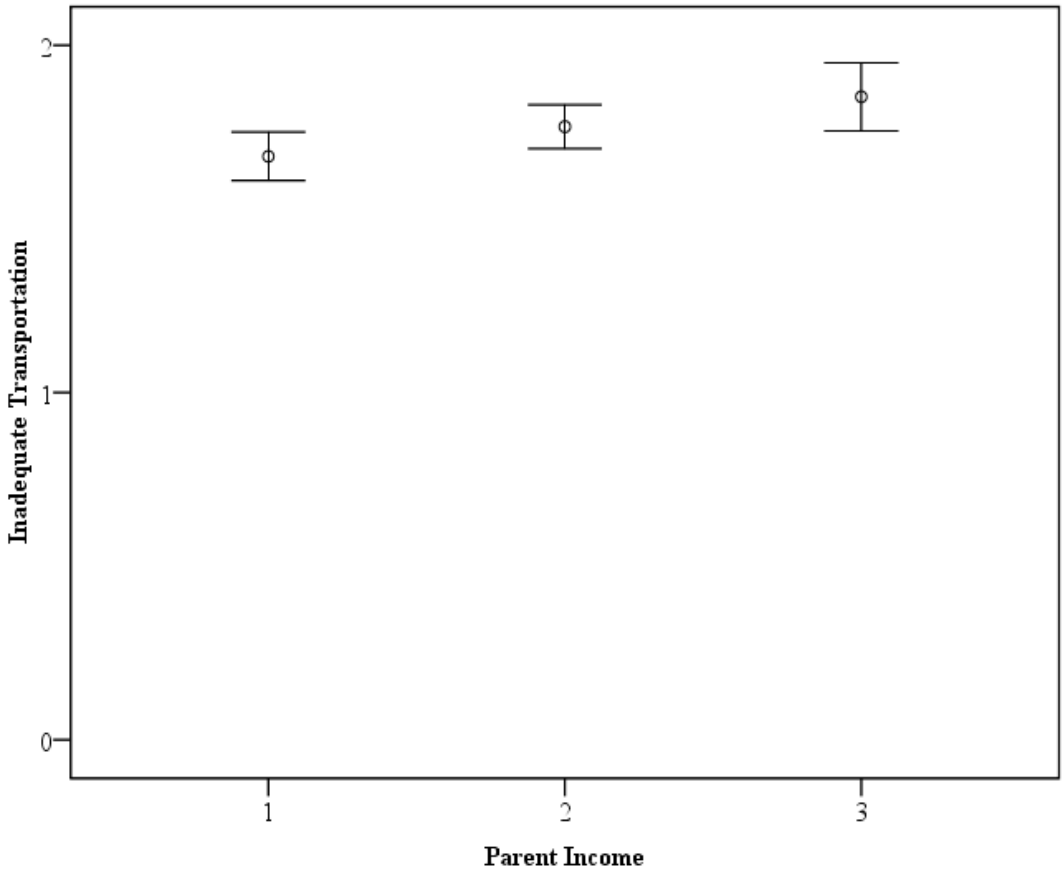
Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Age					
20 or younger	-1.023	0.025*	0.360	0.147	0.880
21-30	-0.457	0.302	0.633	0.266	1.509
31 or older	0	-	-	-	-
Parent Income (U.S. Dollars)					
24,999 or lower	-1.239	0.013*	0.290	0.109	0.770
25,000-74,999	-0.626	0.191	0.535	0.210	1.365
75,000 or higher	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=20 or younger, 2=21-30, 3=31 or older

Figure 4.17. Inadequate Transportation mean score for Texas Latinos by age, 2010.



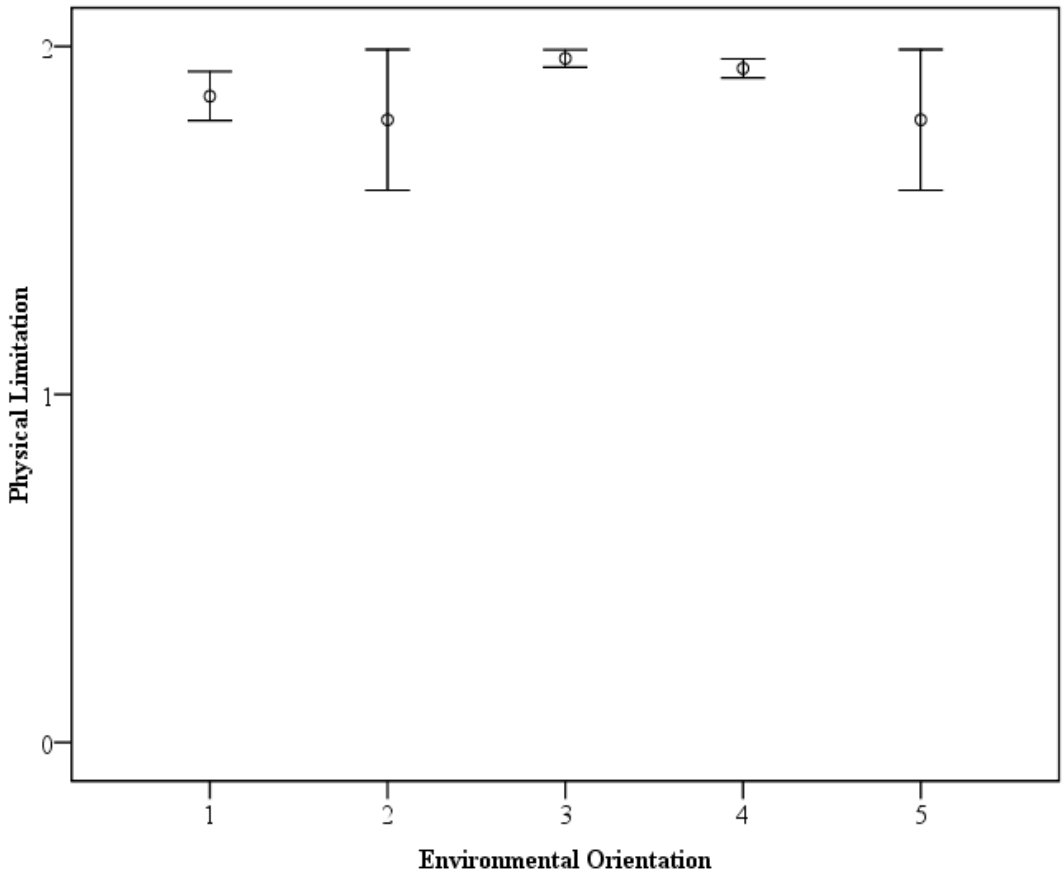
1=$24,999 or lower, 2=$25,000-74,999, 3=$75,000 or higher

Figure 4.18. Inadequate Transportation mean score for Texas Latinos by parent income, 2010.

Table 4.15. Model parameter estimates for significant ($P < 0.05$) variables predicting outdoor recreation accessibility via "physical limitation" as a constraint for the Texas Latino population, 2010.

Variable *Category*	B	*P**	Odds Ratio	95% LCL	95% UCL
Environmental Orientation					
Don't Know	0.905	0.325	2.471	0.407	14.991
Active	-0.201	0.872	0.818	0.071	9.373
Sympathetic	2.913	0.006*	18.416	2.295	147.756
Neutral	1.373	0.101	3.948	0.764	20.411
Unsympathetic	0	-	-	-	-

*Significant at *P<0.05* for comparisons among model variables.



1=Don't Know, 2=Active, 3=Sympathetic, 4=Neutral, 5=Unsympathetic

Figure 4.19. Physical Limitation mean score for Texas Latinos by environmental orientation, 2010.

Constraints, Texas non-Latino White Population.—None of the independent variables (sex, age, environmental orientation, political candidate's environmental position, mother's educational attainment, father's educational attainment, student income and parent income) included in this study exclusively influenced Texas non-Latino white outdoor recreation participation.

DISCUSSION

Combined Population

When I combined all three populations, parent income, age, place of origin, and environmental orientation were factors that influenced constraints to outdoor recreation participation. Income is an issue for most college students. In my study, lack of income (parental income) acted as a constraint to outdoor recreation participation. For example, it was a factor in: not enough money to participate in outdoor recreation activities, lack of participation due to personal health reasons, and inadequate transportation. Age influenced outdoor recreation participation when participants were young. For them, the constraint was related to inadequate transportation. Place of origin (Mexicans) was a major influence on outdoor recreation participation. Place of origin was related to the following as constraints: inadequate transportation, crowded activity areas, personal safety reasons, inadequate facilities, poor maintenance, pollution problems, inadequate information, and physical limitation. Texas Latino respondents were more odds likely, than their counterparts, to indicate that their outdoor recreation participation was not constrained by a household member's disability. Finally, poor maintenance and

pollution problems were constraints to outdoor recreation participation for participants whose environmental orientation was active.

Texas Latino

For the Texas Latino participants in my study, parent income, age, and environmental orientation were factors that influenced outdoor recreation participation. Parent income influenced two constraints: not enough money and inadequate transportation. Age (20 or younger) was also a factor relative to inadequate transportation as a constraint. Finally, when a Texas Latino respondent indicated their environmental orientation was sympathetic, they were more odds likely to state that a physical limitation did not constrain their outdoor recreation participation.

When considering general outdoor recreation participation and constraints to outdoor recreation participation along the U.S.–Mexico border, it is not surprising to discover that for a college student in this region, parent income is a major contributing factor to participation. Generally speaking, college students do not have a lot of spending money; however, college students along the U.S.–Mexico border, especially Latino college students, are at a greater disadvantage because they have very limited resources available. The region's historical poverty (See Introduction) continues to plague the Latino community. Poverty is not solely connected to individual advancement in the region, but also to city and regional planning. The cities of Laredo, TX, USA, and Nuevo Laredo, Tamaulipas, MX, for example, comprise a major gateway to Central and South America, yet the wealth that is transported from each side of the border does not reach the general population of the region, and the area is also poor in

terms of parks and outdoor recreational opportunities. The only major park in Laredo, Lake Casa Blanca, has been turned into a State Park that charges an entrance fee, has a below average playground for a State Park, and on a positive note, has a public bus route stop. In Nuevo Laredo, a major park in the city is the Parque Viveros, which is located along the Rio Grande River; thus safety from drug activity is of concern. On a positive note, Parque Viveros has a bus route stop. Its location, however, is not considered safe, thus there is a scarcity of accessible parks and natural areas, especially shaded areas, throughout both major border cities.

My study found other constraints affecting outdoor recreation participation along the Texas-Mexico border region, which included crowded activity areas, personal safety concerns, poor maintenance and information, pollution and inadequate facilities, and accessibility (financial and transportation). Ironically, Mexican participants in my study have been more environmentally concerned than their U.S. counterparts (see Chapter II) and they have behaved in a more environmentally-conscious manner than their U.S. counterparts (see Chapter III), yet they are the most constrained recreationally. If barriers (inadequate transportation, inadequate information, no disabled person access, unsafe conditions, and crowded activity areas) were replaced with more safe, accessible, pollution-free, safe, and well-maintained facilities, Mexican outdoor recreation participation would increase.

While it is clearly difficult to promote the creation of parks and green spaces versus more public assistance programs on both sides of the Lower Rio Grande Valley region, a historically poor region, without a concerted effort in this area, it will become

increasingly difficult to promote the importance of the region's wildlife corridor, unique natural resources, and potentially increase positive participation in outdoor recreation activities. Land and natural resource managers must "sell" their products (natural resources, wildlife, birding, fishing, etc.) to the public, especially the youth, to gain their favor and acceptance, and to promote their services. Public services require public buy-in, and targeting tomorrow's clientele is key to success. From a simple catch and release fishing program to basic birding techniques and to linking natural resources to cultural and historic landmarks, all will promote outdoor recreation participation and support for future natural resource programs. Parks in the Lower Rio Grande Valley region should be used to promote natural landscapes (thus increasing wildlife habitat) by being built around natural landscapes. In this way, participants will become more educated about the natural landscapes, their cultural significance as well as the fragility of the region, thus promoting a more environmentally friendly ambiance. Most importantly, to obtain buy-in from this region, all information should be linguistically and culturally appropriate, i.e., in Spanish.

CONCLUSION

Participants (Mexicans, Texas Latinos, Texas non-Latino whites) in my study were from the US (Texas) and Mexico (Chihuahua, Tamaulipas, and Coahuila) along the critical Lower Rio Grande Valley, thus they represent an important emerging stakeholder for the future of natural resource conservation in the region. My study findings suggest a disconnect between recreational resources and participant needs, especially for Mexican participants who were more environmentally concerned and

more environmentally friendly in their behaviors, than their U.S. counterparts (see Chapters II and III). Recreational outlets should be made more accessible whereby individuals of all socioeconomic classes can partake in the benefits of participation. Recreation and natural resource agencies should provide more accommodating recreational areas (lighting, security, shaded, greenery, gardens, green space, bus route, no fees, etc.) along this border region.

CHAPTER V

CONCLUSION AND IMPLICATIONS

Given the sociodemographic shift, engaging the Latino stakeholder is now essential for the conservation and management of natural resources. Current and future natural resource management programs will require a reciprocal partnership between natural resource agencies and the Latino community. As stated earlier, the United States-Mexico Rio Grande River Valley is an important wildlife corridor area in North America. Furthermore, the rapid Latino population growth in this region has many implications for natural resource management agencies, ranging from advertising to program implementation. It is important to understand differences in stakeholder attitudes and knowledge to achieve acceptance and success in the management decisions made by wildlife agencies, especially in this critical region where culture, politics, industry, and natural resources collide. The overall objective of my study was to gain an understanding of three different populations (Mexicans, Texas Latinos, and Texas non-Latino whites) on the U.S.—Mexico border to better inform decisions related to the management of the area's natural resources. Specifically, my dissertation objectives were to: (1) determine the attitudes college and university students living in this geographic region hold toward environmental concern (Chapter II), (2) determine the general behaviors of college and university students living in this area, with respect to various environmental activities (Chapter III), and (3) determine recreational behaviors of college and university students living in this area (Chapter IV). In this final chapter, I present research highlights from my objectives and the implications of these findings.

ENVIRONMENTAL CONCERN

With respect to environmental concern among the three population groups, I found that college students' environmental attitudes were associated with both sociodemographic (sex, father's educational attainment, and place of origin) and sociopolitical (environmental orientation and political candidate's environmental position) variables. On average, females tended to have higher levels of environmental concern than males; thus, if a natural resource agency wishes to gain support for environmental initiatives that promote environmental stewardship, women are more odds likely to be responsive to such programs, a good thing since women comprise the majority of the population in some areas of the Lower Rio Grande Valley (e.g., 52% females, 2008 U.S. Census data). With regards to environmental orientation, when all three population groups were combined, participants with a neutral or a "don't know" environmental orientation had lower environmental concern scores than their counterparts who had either a sympathetic or unsympathetic environmental orientation. This finding seems to indicate that participants who have not formed an environmental orientation of sympathetic or unsympathetic (they chose "don't know" or "neutral"), will be more difficult to engage in environmental discourse. This information is useful to organizations when selecting groups to target in their outreach programming. Finally, when place of origin was used as an independent variable, study findings suggest that Mexicans have greater levels of environmental concern than both Texas Latinos and Texas non-Latino whites. I hypothesized that Mexican participants scored higher on the environmental concern scale for reasons that are compounded by history; political

differences in structure, regulation and enforcement of environmental laws; positive cultural practices; socioeconomic class status; and proximity to environmental hazards (see Chapter II). The finding that Mexicans harbor greater environmental attitudes than their U.S. counterparts is significant because in the United States, particularly along the Lower Rio Grande Valley, there is a misperception that Mexicans do not care about the environment. My study findings refute this misperception. These factors are important considerations when implementing outreach programs, as information dissemination via non-traditional methods reach a wider audience.

As the results indicate in Chapter II, several factors influenced the environmental concern of Mexicans. These were age, combined parent income, and mother's educational attainment. On average, younger Mexicans have a higher environmental concern score than their older counterparts. Regarding parents' combined income, Mexican respondents in my study, who were very poor or who were very rich, scored higher on the environmental concern scale than their middle class counterparts. With respect to Texas Latino college students, their environmental attitudes were associated with sociodemographic variables (sex and father's educational attainment) and sociopolitical variables (environmental orientation and political candidate's position on environmental issues). Again, females had a higher environmental concern than males did. The significance of sex is important if a natural resource agency wishes to implement a new program or propose a new resource policy. My study results suggest that, compared to men, women are likely more receptive to programs or policies that promote environmental stewardship than men are. Texas Latino college students who

indicate they have not formed a definitive environmental orientation (responded "neutral" and "don't know") scored lower on the environmental concern scale than their counterparts ("active," "sympathetic," or "unsympathetic"). This information should prove useful to natural resource agencies who wish to engage the young, educated members of the Latino community in program development and implementation. Again, targeting non-traditional audiences and a varied array of information dissemination methods are recommended to increase environmental awareness and concern among the Latino population. Finally, I found that Texas non-Latino whites whose parents (both mother and father) had a higher educational attainment were less likely to harbor greater environmental concern than their counterparts whose parents had a lower education. This information is important because it suggests that outreach programs should be designed to reach all young children. Information delivery should take place in elementary schools via appropriate curriculum and then supplemented by natural resource agencies via outreach programming in schools and in all communities. This will ensure the promotion of proenvironmental concern and the conservation of natural resources.

ENVIRONMENTAL BEHAVIORS

Attitudes are important windows to behavior. In the previous chapter, I examined environmental concern. This section will focus on reported environmental behaviors of these same individuals. When I combined all three population groups (Mexican, Texas Latino, and Texas non-Latino white college students), environmental behaviors which involved having to pay money for a service or good (avoiding

environmentally harmful products, changing oil, and lawn responsibility), were more likely to be associated with sociodemographic variables (sex and place of origin), such as parental socioeconomic position, i.e., educational attainment and income. Environmental behaviors that involved donating time or money to a cause, such as environmental conservation contributions where exchanges of tangible goods (products or services) are nonexistent, were more associated with the sociopolitical variables environmental orientation and political candidate's environmental position. My study also found that Mexicans were more odds likely to avoid environmentally harmful products than their Texas Latino and non-Latino white counterparts, when all three populations were combined. Apparently, environmental behaviors associated with sociopolitical variables are more likely reflective of theories that do not involve the invocation of peer pressure, as suggested by McCleery et al (2006), as these sociopolitical variables are held at a deeper moral locus and are less prone to peer pressure.

Results for Mexican participant behaviors are summarized in terms of influential variables. When Mexican participants indicated they were responsible for a lawn, parent income influenced lawn care (frequency of fertilizer application). This finding is important because it informs us that when it comes to fertilizer use, the individuals who should be targeted for outreach education regarding the negative environmental effects of fertilizers are those in lower to mid-income brackets. Another finding indicates that gender influences the frequency of fertilizer use by Texas Latinos, specifically, those who indicated they were responsible for lawn care. Males were more odds likely to be

responsible for lawn care than females. For outreach education purposes, the curriculum should pay special attention to the frequency of fertilizer application and the negative effects this has on natural resources, as well as more environmentally friendly alternatives to fertilizer use. The Texas non-Latino white participants in my study were not influenced by any of the introduced variables included in this study.

My recommendation with respect to targeting environmental behaviors is that natural resource agencies alter their outreach strategies to involve more non-traditional approaches, such as promoting and marketing altruistic behaviors among Latinos via public service announcements (PSAs). This will serve to increase environmental conservation awareness and promote more proenvironmental behaviors. Mexico often selectively markets altruistic behaviors at a national scale. For instance, in the 1980's, a national commercial involved a young girl, Amanda, who is shown opening a water faucet and then leaving the faucet running. Her father then tells her, "Cierrale Amanda." As it was a national commercial, it became a sidebar in homes and a common thread throughout the nation. Its impact was positive toward the conservation of water, and even today, when somebody leaves the faucet running, you can hear families say, "Cierrale Amanda." I believe that promoting altruistic environmentally friendly behaviors is one avenue for success.

Given these findings and the nature of Latino altruistic behaviors (altruism is a cultural trait among Latinos) natural resource organizations should create volunteer-type programs that are more accessible to Latino families (e.g., free recycling bag drop-off and pick-up at home site in Laredo, TX). It is imperative, however, that natural resource

managers and representatives consider the following suggestions. First, they must take care of their volunteers by promoting and allowing for meaningful volunteerism. By meaningful volunteerism I am referring to volunteer disseminating information with other individuals and explaining to others the benefits of natural resource conservation, as opposed to rounding up volunteers for manual labor, such as cleaning up a park. By promoting and allowing for meaningful volunteerism, individuals will experience and feel the benefits of spreading the word and knowledge. Lastly, meaningful volunteerism should involve direct service to individuals and/or animals. Especially with children, volunteer service should involve a tangible product or action that directly benefits others, whether human or animals, thus touching upon higher order motivations (altruism), where the effects are obvious; however, the work should never be demeaning (manual labor). This will create a lasting impression among children.

OUTDOOR RECREATION

With respect to outdoor recreation behaviors, when I combined all three populations, parent income, age, place of origin, and environmental orientation were factors that influenced outdoor recreation participation. Income is an issue for most college students, including participants in my study, where they indicated that not having "enough money" was a constraint. Income influenced participation specifically when money was required to participate in an activity, when personal health reasons were involved, and when they did not have access to adequate transportation. Age influenced outdoor recreation participation. For younger participants, their constraint was related to inadequate transportation. Place of origin, i.e., being Mexican, also influenced outdoor

recreation participation. Mexican origin participants indicated the following were constraints to their outdoor recreation participation: inadequate transportation, crowded activity areas, personal safety reasons, inadequate facilities, poor maintenance, pollution problems, inadequate information, and physical limitation. Reasons for this are described below. Finally, environmental orientation also influenced outdoor recreation participation. Participants who were "active" in their environmental orientation indicated that poor facility maintenance and pollution problems in recreational areas constrained their participation in outdoor activities.

For the Texas Latino participants in my study, parent income, age, and environmental orientation were factors that influenced constraints to outdoor recreation participation. Parent income influenced constraints, i.e., not enough money and inadequate transportation. Age also influenced outdoor recreation participation. Participants who were 20 or younger indicated that inadequate transportation was a constraint to their participation in outdoor activities. Finally, environmental orientation influenced the outdoor recreation participation of respondents who considered themselves "sympathetic" to environmental causes; they were less odds likely to be constrained by a personal physical limitation.

When considering outdoor recreation participation and constraints to outdoor recreation participation along the U.S.–Mexico border, it is not surprising to discover that for a college student in this region, parent income is a major contributing factor to participation. College students, in general, do not have a lot of spending money; however, college students along the U.S.–Mexico border, especially Latino college

students, are at a disadvantage because they have very limited resources available given the historical poverty of the region (See Introduction).

Poverty is not solely connected to individual advancement in the region, but also to city and regional planning. Laredo, TX, USA, and Nuevo Laredo, Tamaulipas, MX, for example, comprise a major gateway to Central and South America, yet the wealth that is transported from each side of the border does not reach the general population within the region, nor the city governments, as reflected in the area's very limited parks and outdoor recreational opportunities.

My study found other constraints affecting outdoor recreation participation along the Texas-Mexico border region, which included crowded activity areas, personal safety concerns, poor maintenance and information, pollution and inadequate facilities, and accessibility (transportation as well as accessibility to those with physical limitations). While it is clearly difficult to promote the creation of parks and green spaces versus more public assistance programs in this historically poor region, without a concerted effort in this area, it will become increasingly difficult to promote the importance of the region's wildlife corridor, unique natural resources, and potentially increase positive participation in outdoor recreation activities.

Land and natural resource managers must "sell" their products (natural resources, wildlife, birding, fishing, etc.) to the public, especially the youth, to gain favor and acceptance, and to promote their services. These public services require public buy-in, and targeting tomorrow's clientele is key to success. From a simple catch and release fishing program to basic birding techniques and to linking natural resources to cultural

and historic landmarks, all will promote outdoor recreation participation and support for future natural resource programs. Most importantly, to obtain buy-in from this region, all information should be linguistically and culturally appropriate. Specific suggestions include the mandatory incorporation of shaded picnic and playground areas, given the region's heat indices. This single, low cost suggestion would dramatically increase participation along this border region. Also, agencies should promote outdoor recreation by providing educational blurps throughout parks, regarding wildlife and natural resources found in the area, i.e., "Have you seen an ocelot (plant or animal picture) lately?" followed by an educational blurp with cultural and historical significance. Wildlife corridors should be promoted via placards, demonstrations, and activity sheets (from project wild, etc., Spanish translations included), and these promotional items should be provided in all park areas and should include access information: "For more information…," or "To learn more…," or "To help…," or "To create your own group of … see (website)." Recycling bins should be placed in park areas, as well as plaques describing the negative impacts of pollution and how each item recycled helps build a safer, more sustainable community. These are but a few simple, cost-effective strategies that should be created and promoted along this region.

IMPLICATIONS

Although current programs must be made more attractive and accessible to all segments of the Texas border community, special consideration should be given to the Latino community in the region (Stodolska 1998, More and Stevens 2000, Lopez 2005), a community that has long been neglected or excluded. In Texas, increasing the

availability of Spanish language materials that are sensitive to the Latino community's cultural and regional differences, which is the most frequently suggested method to consider, is just not enough to engage this emerging stakeholder.

Although my suggestions focus on the Texas Latino community, my study suggests that gender, parent educational attainment, combined parental income, and a political candidate's environmental position, age, environmental orientation, influence Mexican, Texas Latino, and Texas non-Latino white college student attitudes and behaviors regarding the environment, natural resources, and recreation. Natural resource agencies should consider these factors in future programming as final implications to my study.

LIMITATIONS

My study had limitations. One limitation of my study could have been a direct conversion of incomes based on U.S. income brackets as opposed to Mexico income brackets (i.e., a middle class income of $45,000 U.S. Dollars directly converts to $450,000 Mexican pesos; however, this does not mean that $450,000 Mexican pesos is equivalent to Mexico's middle class, it is simply a direct conversion of a dollar figure determined to be part of the United State's middle class, and may not necessarily reflect Mexico's middle class). Geographical, geopolitical, cultural, and societal variations between Mexico and the U.S. could account for these differences. Finally, I assert that multiple years of total immersion in the United States education system and mastery of the English language are factors that influence these differences as well (Cuéllar et al. 1995, Marín and Gamba 1996).

FUTURE WORK

Future studies should consider the above limitations when working with the Latino community and comparing this unique group to other population groups. I propose that future studies and programs incorporate a combination of sociodemographic, sociocultural, and sociopolitical characteristics, as more research in this area will help clarify influences on both Mexico and Texas Latino attitudes toward natural resources and the environment and the behaviors that ensue. My final recommendation is that future research consider the relationship between parental educational attainment and their children's level of environmental concern and behaviors, both proenvironmental and recreational, because in some instances, parental educational attainment inversely influenced participant environmental attitudes in my study.

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